COMPARATIVE STUDY OF PERITONEAL ACCESS BY OPEN VS CLOSED TECHNIQUE FOR CREATING PNEUMOPERITONEUM IN LAPAROSCOPIC SURGERIES

M.S. DEGREE EXAMINATION

BRANCH I - GENERAL SURGERY

Department of General Surgery

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THE TAMILNADU

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CHENNAI, INDIA.

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This is to certify that the dissertation entitled "**COMPARITIVE STUDY OF PERITONEAL ACCESS BY OPEN VS CLOSED TECHNIQUE FOR CREATING PNEUMOPERITONEUM IN LAPAROSCOPIC SURGERIES"** is a bonafide research work done by **Dr. ILAYARAJA S, M.S** Post Graduate student, Department of General surgery, Madurai Medical College and Government Rajaji Hospital, Madurai, under the guidance and supervision of **Dr.S.R.DHAMOTHARAN M.S., FIAGES.,** Professor, Department of General Surgery, Madurai Medical College and Government Rajaji Hospital , Madurai.

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Place: Madurai **DR. ILAYARAJA S.**

Date:

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INTRODUCTION

Access into the peritoneal cavity is the most important step in laparoscopic surgery. Usually there will be less complications in laparoscopic surgery but may happens during primary trocar insertion. The prime complications are intestinal or visceral injury or injury to main arteries or veins.

There are two methods in access technique.

1) Closed access technique.
2) Open access technique.

Closed Access technique

This is the oldest technique with Verres needle.

The complications associated with this technique are injury to major blood vessels, bowel injury and preperitoneal insufflations.

Open access technique

1) Hasson technique.
2) Fielding technique.
3) Scandinavian technique.

Open access technique- The concept in this technique is creating tiny transverse incision, incising the layers of abdominal wall and directly entering into the abdomen.

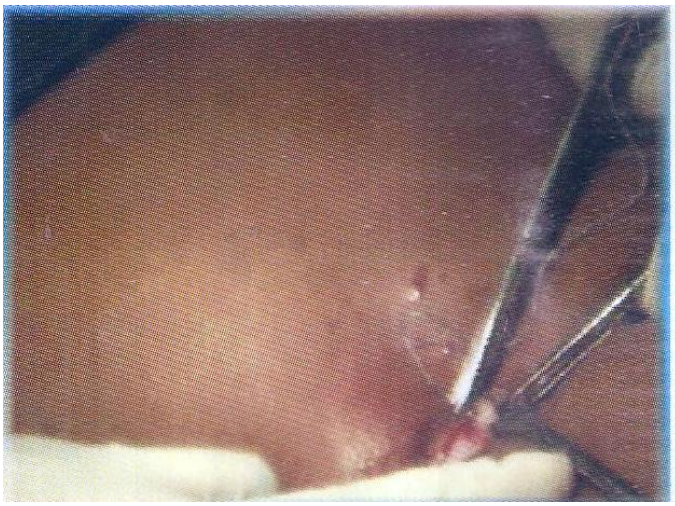
Hasson technique

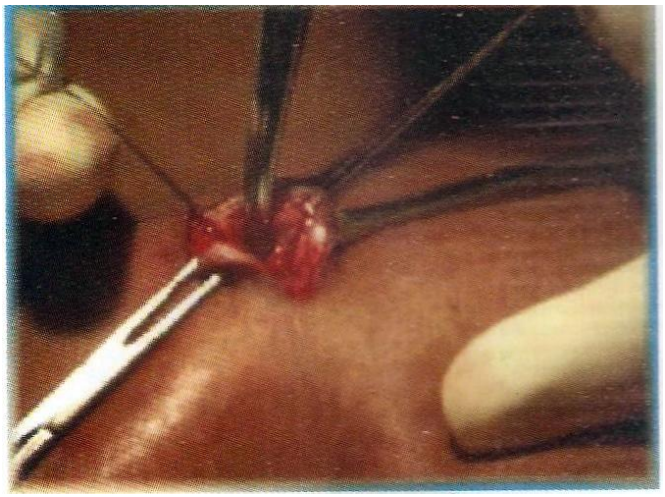
This is an open access trocar method ,which was introduced by Hasson in 1974.

`

A transverse incision around 2.5 cm is made supra (or) infraumbillically (or) Transumbilically.

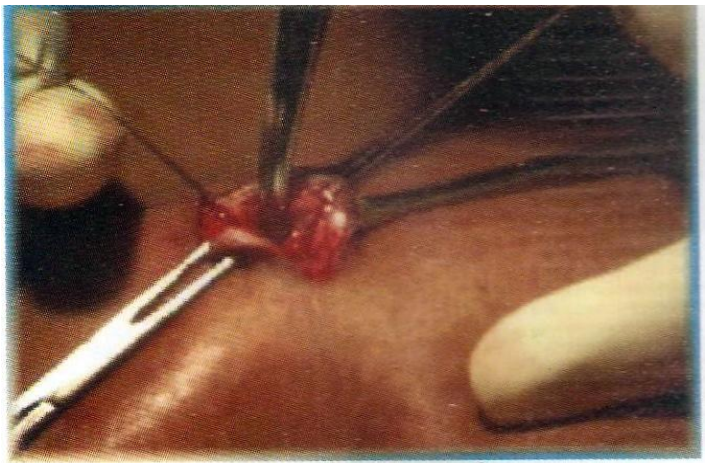
After retracting the upper and lower skin flaps, dissection of subcutaneous tissue is proceeded up to the rectus sheath. Stay sutures are given o the both end of the transverse incision, rectus sheath is incised after elevating the rectus by pulling the stay sutures.

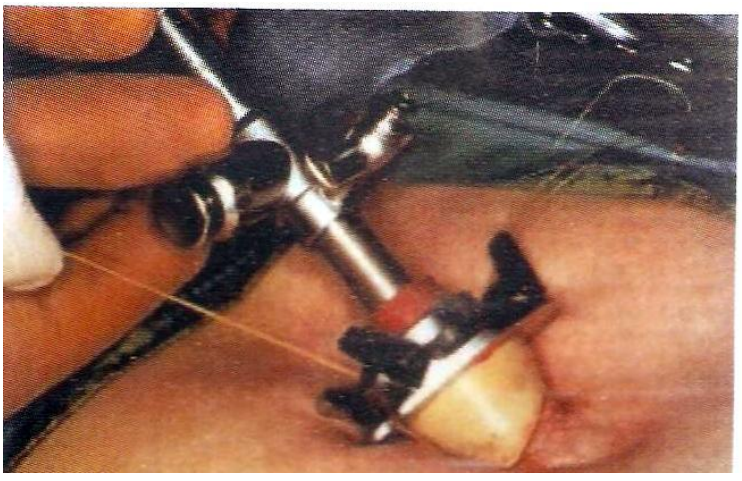




Peritoneum should not be breached with the above said incision, while holding the stay sutures up, a hemostat is stabbed with the peritoneum. The peritoneum is opened with an artery forceps carefully.

The peritoneal breach is expanded with the artery forceps. If any adhesion, felt by a finger inserted through the incision, it should be released with blunt dissection by that finger with care and not to damage the underlying structures within the adhesion.





The Hasson canula is passed through the above said incision, into the peritoneal cavity with care. The cannula will dilate the smaller incision to give an airtight fit.

If the incision is big to hold the port in proper position stay sutures may be given to hold the cannula.

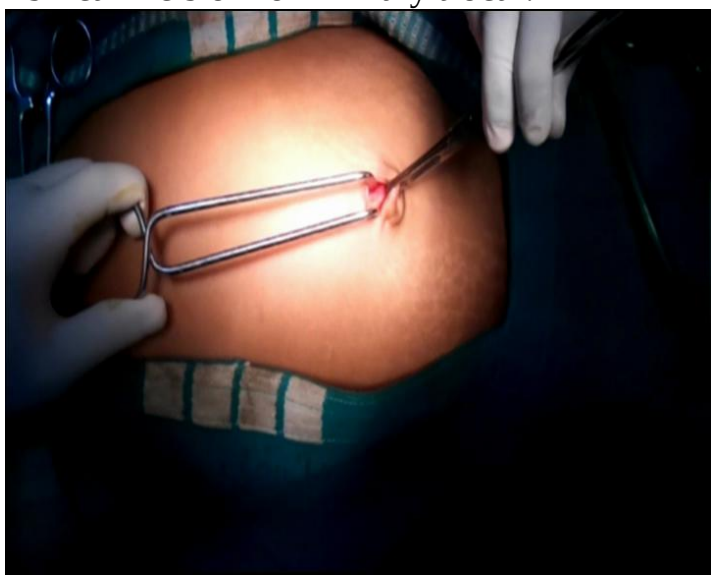
Pneumoperitoneum is created under direct vision.

Open technique

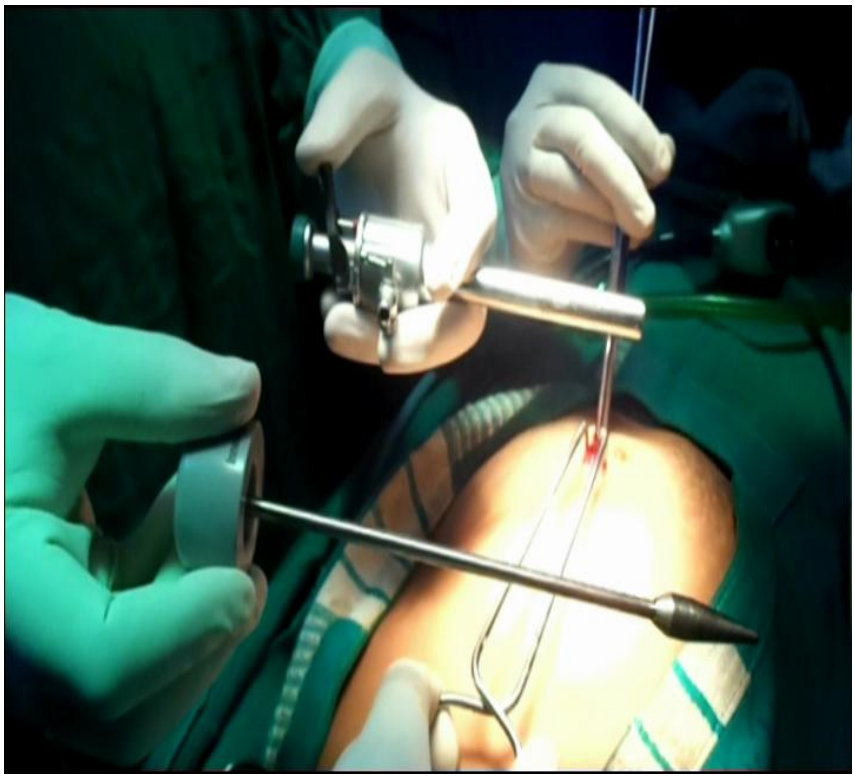
In this technique a small 10mm transverse skin incision is made supraumbilically, which will show the junction of the base of umbilicus with the linea alba. A tiny slit is made vertically at this junction using 11 size blade. A specially designed cannula with blunt and cone shape tipped trocar is inserted through the above said slit , which will dilate the small slit and enter into the peritoneal cavity safely with air tight. There is no need for fascial sutures.

OPEN ACCESS METHOD

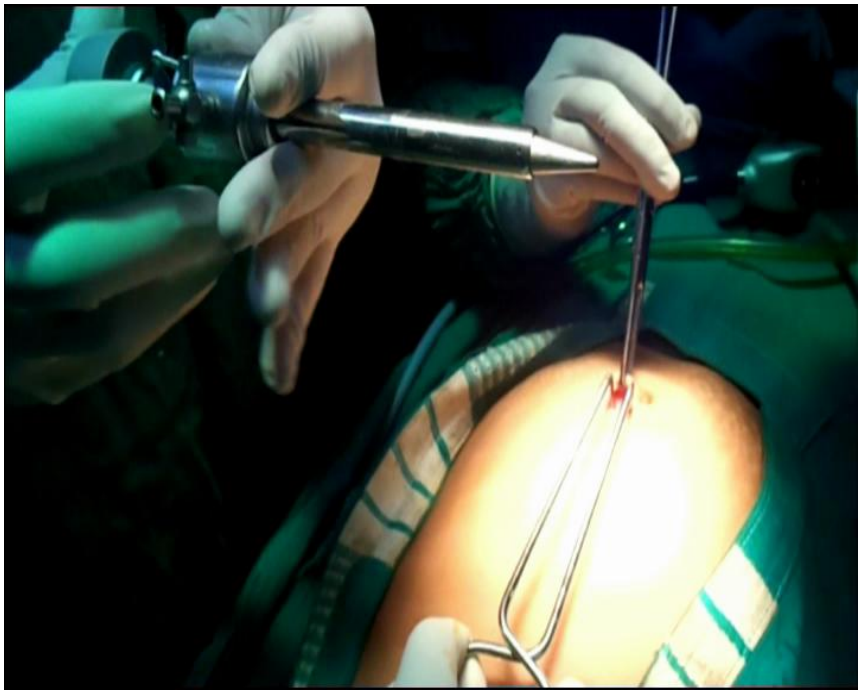
Supraumbilical incision for Primary trocar.



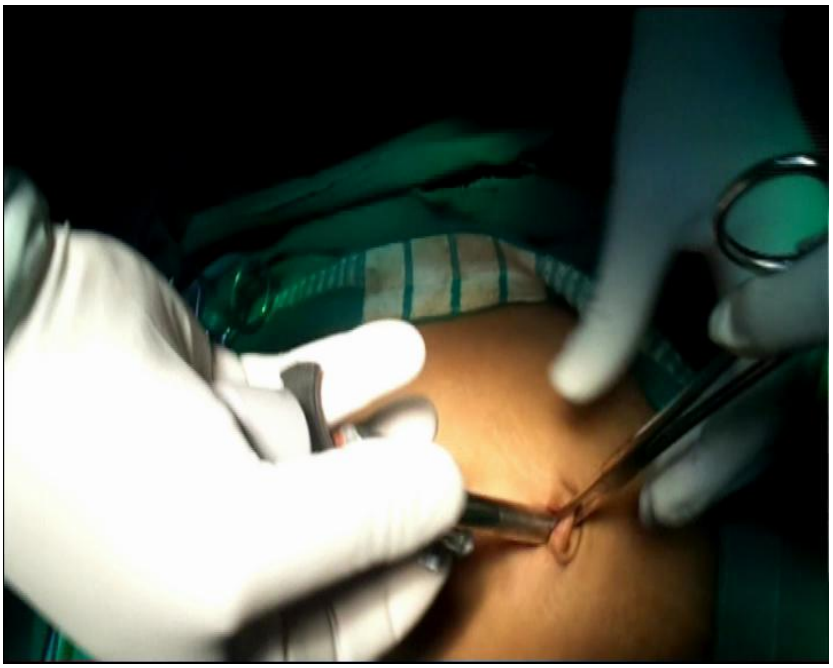
Incision being dilated to expose the junction point of base of the umbilicus with the linea alba.



Blunt conically tipped trocar with cannula.



Trocar with cannula being passed through the slit .



Primary port

Advantages of open technique over closed technique

1. Major vascular injury is very less .
2. Injury to Bowel and other solid organs are very less when compare with closed access method .
3. Preperitoneal insufflation is least in open method.
4. Small Port site incisions can be closed in layers, thus preventing incisional hernia.
5. Suitable for patients known to have peritoneal adhesion and TB abdomen.
6. It is safe for patients who underwent any abdominal surgery.
7. Safe for pregnant patients.
8. Safe for patients with low BMI – Thin built.
9. Safe for Pediatric age group.
10. Incidence of gas embolism is very loss.

HISTORY

In 1901 George Keilling had done first diagnostic abdominal laparoscopy.

In 1930, reports about therapeutic laparoscopic procedures were published.

Initially the laparoscopic procedures were used for the release of intra abdominal adhesions and for biopsy taking.

Between 1960 and 1970 Laparoscopy was used widely in the practice of Gynecology.

After 1986,the video monitors started providing a clear and magnified views, the general surgeons started using this widely.

In 1987, French physician Dr. Mouret performed first laparoscopic surgery on a human patient.

Milestones in the laparoscopic surgery

1902	George Kelling – first laparoscopic procedure in Dogs
1910	Hans Christian, Swedan – first laparoscopic surgery in human
1920	Zollikofer discovered the benefit of CO2 for insufflation
1938	Janos Veress – Invented needle for creating pneumo peritoneum
1966	Hopkins invented rod lens and cold light
1974	Dr. Hamith in Hasson – Hasson's technique

1980	Patrick Sephoe, Laparoscopic procedures in sterile OT
1982	First video laparoscopy
1987	Phillipe Mouret – first video laparoscopic cholecystectomy, France

Laparoscopy is a meaning of two Greek words ‘flank’ and “insight’ that mean intra abdominal insight.

GENERAL CONSIDERATIONS OF LAPAROSCOPY OPERATION THEATRE AND INSTRUMENTS:

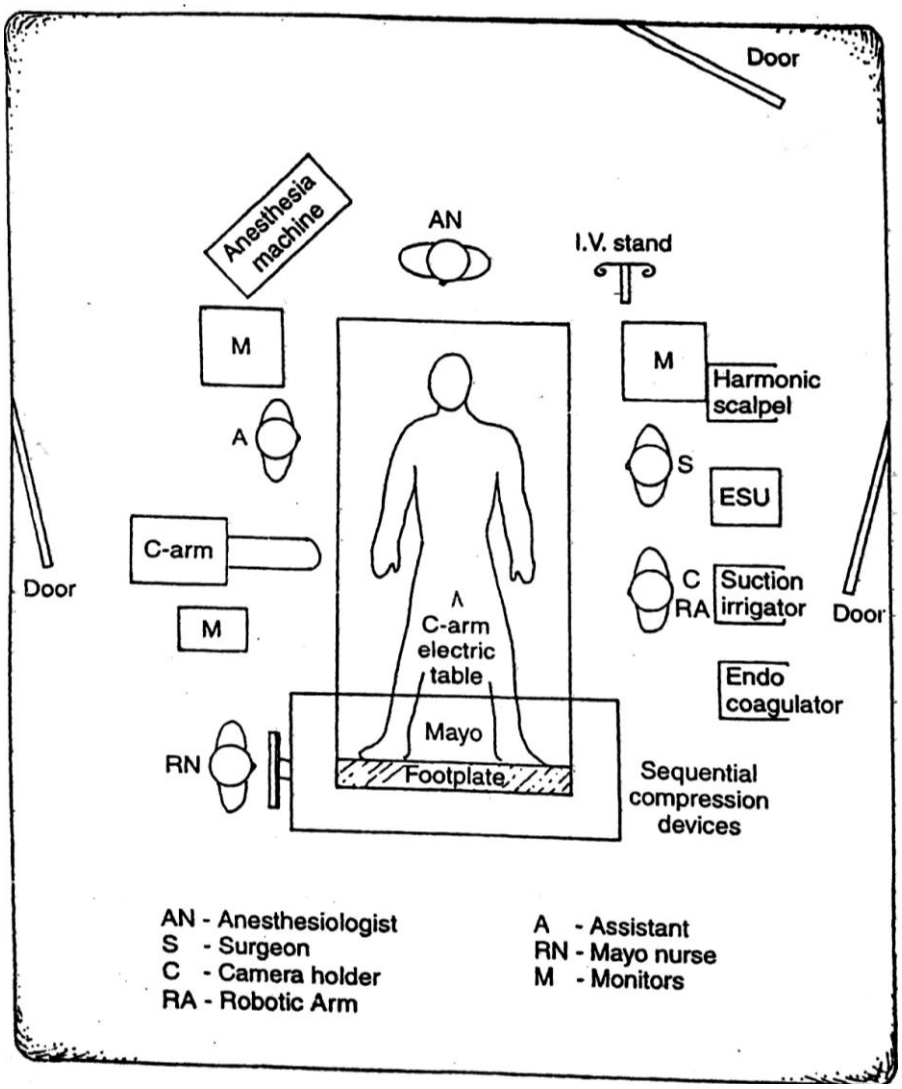
1. Operation theatre room size is an important criteria in positioning the operation table position.

2 .Location of the operation theatre table is also decided by the position of the operation theatre door.

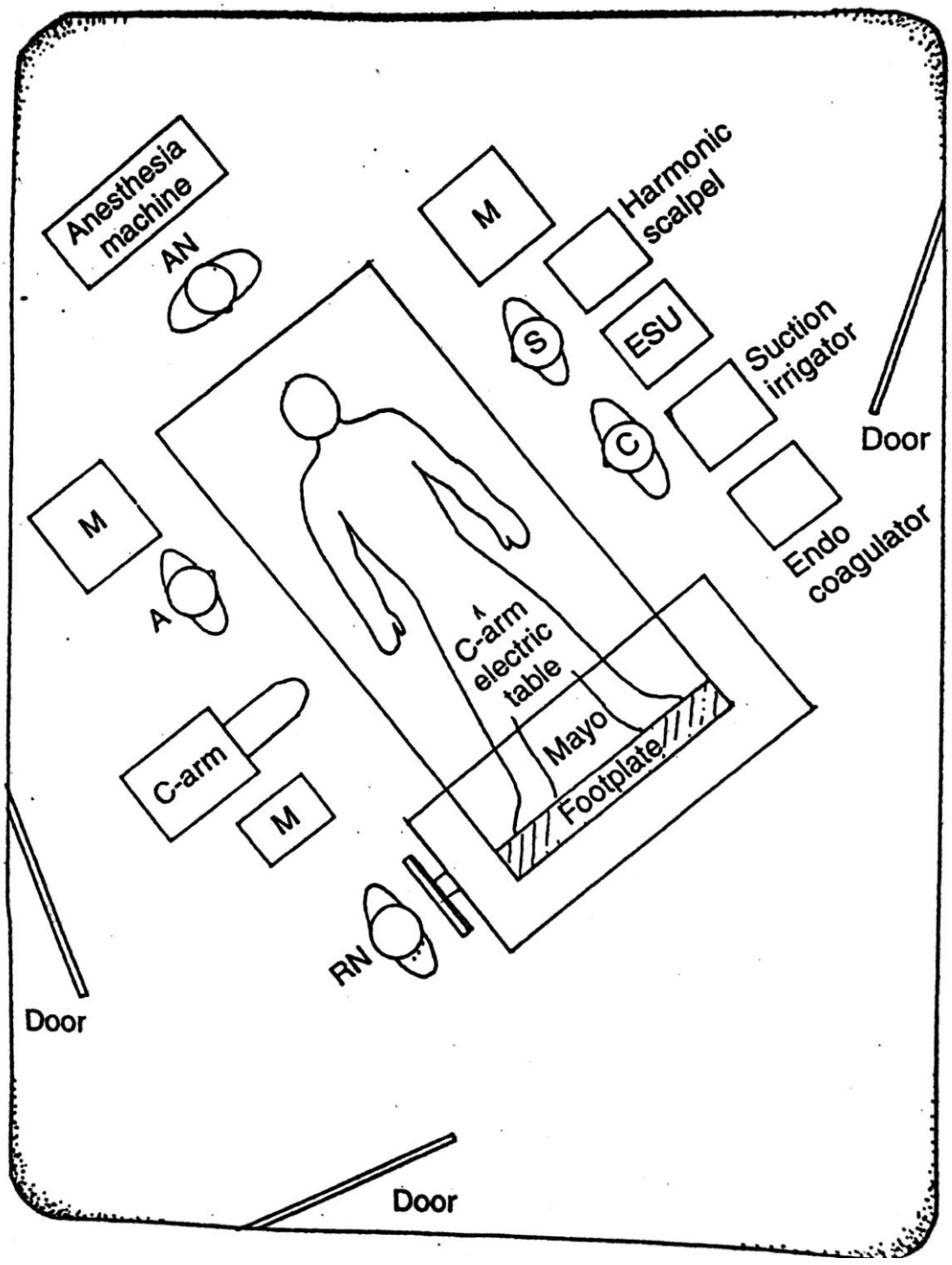
3 If the room is large enough to accommodate the table , the position of the table may be in normal position.

4 If the room is small, the OT table may be positioned in a diagonal manner..

5 The OT room should be large enough to accommodate the anaesthetic equipments and other electrocautery instruments and monitors to be arranged around the table.



Large OT room with normal position of the table



Small OT room with OT table.

EQUIPMENT CHECK LIST:

The equipments should be checked prior to the arrival of the patient into the operation theatre.

The instruments needed for laparoscopic surgery are listed here

Some other instruments may be needed for advanced surgeries.

a) Boyles apparatus and other anesthetic needs
b) Movable with position changeable operating table.
c) Video monitors preferably two in numbers.
d) Suction and irrigating apparatus
e) Electrocautery system with monitors
f) i. Light source equipment
   ii CO2. Insufflator equipment
   iii .Pressure monitors
   iv. image processing equipment. These should be arranged in a portable trolly.
g. The table should be ready with
   i. open or closed trocar system instruments
   ii. Drapping towels with clips
   iii. Light source cable
   iv. insufflators tubings
   v. Suction tube and irrigation tube.
   vi. Electrocautry cables.
   Vii Other essential surgical instruments like
      blades with handles,
      retractors,
      Artery forceps medium size –straight and curved,
      Mosquito forceps – straight and curved,

Needle holder,

scissors

Needles with suturing materials

viii. Laparoscopic instruments:

Graspers : toothed and atraunatic

Curved dissector

Straight dissector

Right angled dissector

Retrctors

Scissors

Bowel grasper

Hook

Clipping equipments

Stappling equipments

Ligators

Cautery monopolar

3. Equipment set up

Enough space should be given for anaesthetist and for his instruments.

The monitors and cables should not be arranged in such a way that it is not a hindrance in the movement of surgeon and assistants, as they may change the places.

Things should be kept ready for open surgery if the laparoscopic surgery is converted.

4. Equipment checking

Two carbon di oxide cylinders with adequate gas should be in OT.

The cylinder should be fitted properly.

Insufflator should be in working condition

Irrigation fluid container should be full

Electrocautery unit should be checked.

5. After Drapping:

The light cable and camera should be connected.

Focussing and white balancing should be done.

Electrocautry should be checked.

Trocar and cannula should be checked.

Handles of Laparoscopic instruments should be checked for its movements

Stay sutures and retractors should be kept ready in HASSON system.

THERMAL INJURY TO THE PATIENT

Thermal injury is common in

- Single port surgery
- NOTES
- Robotic surgery

How to prevent :

- Using Bipolar system
- Harmonics
- Excision

Access to Abdomen :

In Laparoscopic surgery, the entry of Primary trochar and instruments is called access technique.

Usually the complications of laparoscopic surgery happens during access technique.

There are two types of access in laparoscopy.

1. Closed access
2. Open access

Closed access :

This is the oldest method .

In this technique the veress needle is inserted blindly in to the abdominal cavity for insufflation.

But this method is not applicable for some procedures like axilloscopy, total extraperitoneal approach for hernia repair and retero peritoneoscopy.

Closed technique will not be safe in the following situations when compare with open technique.

1. Thin individuals
2. Children
3. Patients with previous history of abdominal surgery
4. Patients with intraabdominal adhesions.

5. TB abdomen
6. Pregnancy

Layers of anterior abdominal wall :

Skin

Subcutaneous tissue

Fascia: Campers- fatty superficial layer.

Scarpas – deep fibrous layer.

Muscle :

External oblique muscle

Internal oblique muscle

Rectus abdominis

Transverse abdominal muscle

Pyramidalis muscle

FASCIA TRANSVERSALIS

PERITONEUM

Arteries of anterior abdominal wall

Superior epigastric artery

Inferior epigastric artery

Superficial epigastric artery

Superficial circumflex iliac artery

Superficial external pudental artery

Deep circumflex iliac artery

Umbilicus :

Umbilicus is a scar which remains after the obliteration of the umbilical cord.

The choice for access is Umbilicus because -.

This point is devoid of Muscles , vessels and nerves

Skin, fascia and peritoneum adherent together.

Devoid of fat

Less bleeding

Cosmetic ground

Ergonomically better (centre point of abdomen)

Closed Access technique :

Equipments

1. Veress needle
2. Insufflator

1. Types of Veress Needle :

Disposable

Reusable

Disposable :

Made with plastic material

2mm diameter,

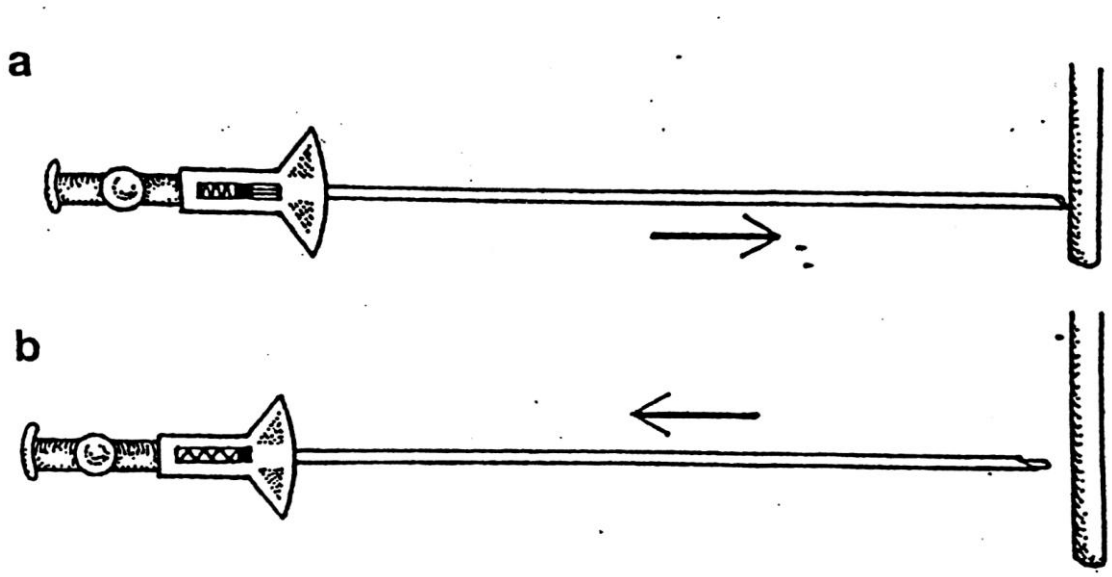
Length 7cm and 12 cm,

Size14 gauge

a) Resuable :

It is a metal one .

Before starting the procedure the patency should be checked with flushing saline, then leaking of the needle should be checked with occluding the tip of the needle on pushing the fluid. Screws and connections should be checked in reusable one.

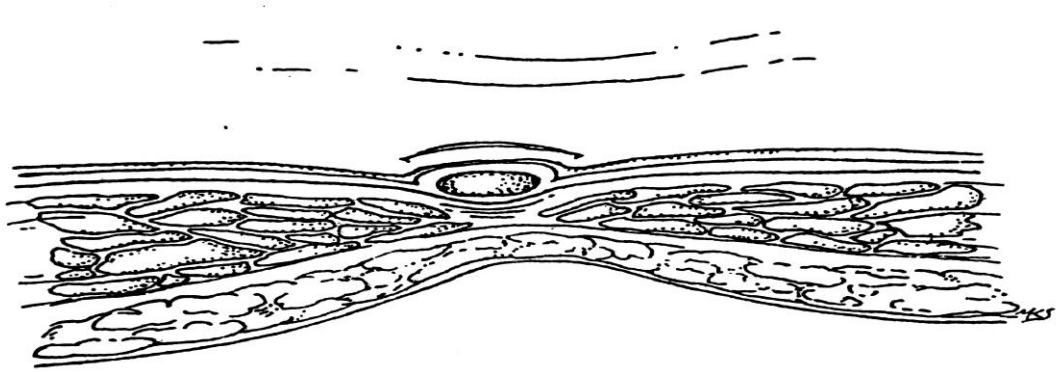


Veress Needle

Patient should be nil orally for atleast 8 hours, stomach should be decompressed with Ryles tubs and bladder should be catheterized. Bowel

preparation must be done. A good enema will help during the procedure by avoiding additional port for retraction.

Patient is placed in supine position. Verres needle is inserted supraumbilically or infraumbilically, If there is no surgical scar in the anterior abdominal wall



Cross section of umbilicus

Position of the patient :

This sleep Trendelenburg's position helps in cranial movement of the intestines will give a relative empty pelvis aiding atraumatic insertion of verress needle into the peritoneal cavity.

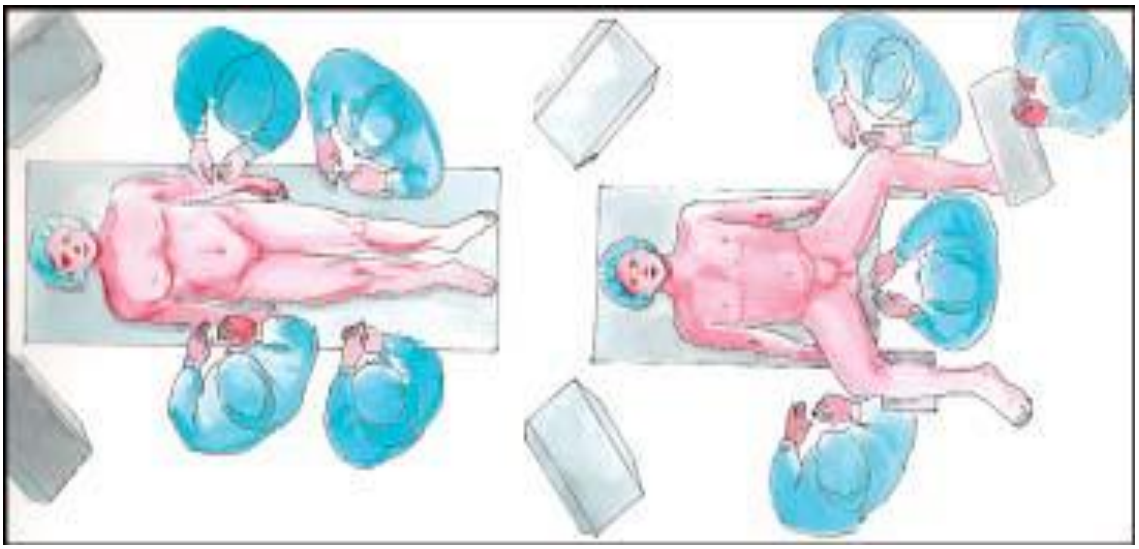
If hysteroscopy is planned with laparoscopy lithotomy position is preferred. If thoroscopy or retroperitoneoscopy is planned, lateral position is the choice.

DIFFERENT POSITIONS OF SURGEON AND ASSISTANTS

The main surgeon should keep the eyes on the video screen. The assistant surgeon should assist the surgeon effectively. The surgeon should need an efficient assistant in laparoscopic surgery.

FRENCH POSITION

The surgeons place in this position is – facing perineum and in between thighs.



AMERICAN POSITION FRENCH POSITION

AMERICAN POSITION - The place of the surgeon in this position is left to the patient.

The place of surgeon

The surgeon can adopt any place on any side according to the good ergonomics after the access.

The left handed surgeon should be in the patients right side during access after which the surgeon should go to the opposite side of the diseased organ.

For example, the surgeon will be in the left side of the patient for appendectomy, right ovarian cyst, right sided hernia or cholecystectomy .

POSITION OF THE CAMERA ASSISTANT

It is better to have two monitors for surgeon and camera assistant, as generally the camera assistant will be opposite to the main surgeon.

FOR UPPER ABDOMEN SURGERY:

Surgeon – left to the patient

Assistant- right to the patient

FOR LOWER ABDOMEN SURGERY:

Surgeon – right to the patient

Assistant- left to the patient

PREPARATION FOR ACCESS :

General :

1. Ryles tube insertion
2. Bladder catheterization
3. Consent
4. Per abdominal examination to rule out any mass lesion.
5. After painting and drapping, all connections should be made.
6. Focusing and white balancing of camera

By keeping the gauze piece 7 cm away from the tip of the camera proper focusing and white balancing should be done.

PNEUMOPERITONEUM

I CO_2 is preferred for creating pneumoperitoneum for the following reasons.

1. Easily diffusible
2. Will be excreted by lungs easily
3. As it is an non – flammable , electrocautry can be used safely.
4. CO_2 mixes with peritoneal fluid gives carbonic acid, which is a mild antiseptic thus prevents infection, but it irritates diaphragm causing shoulder pain and abdominal discomfort
5. Risk of air embolism is minimal.

II N_2O :

It has mild analgesic property. It can be used for short procedures N_2O should not be used for prolonged procedures as it supports combustion better than air.

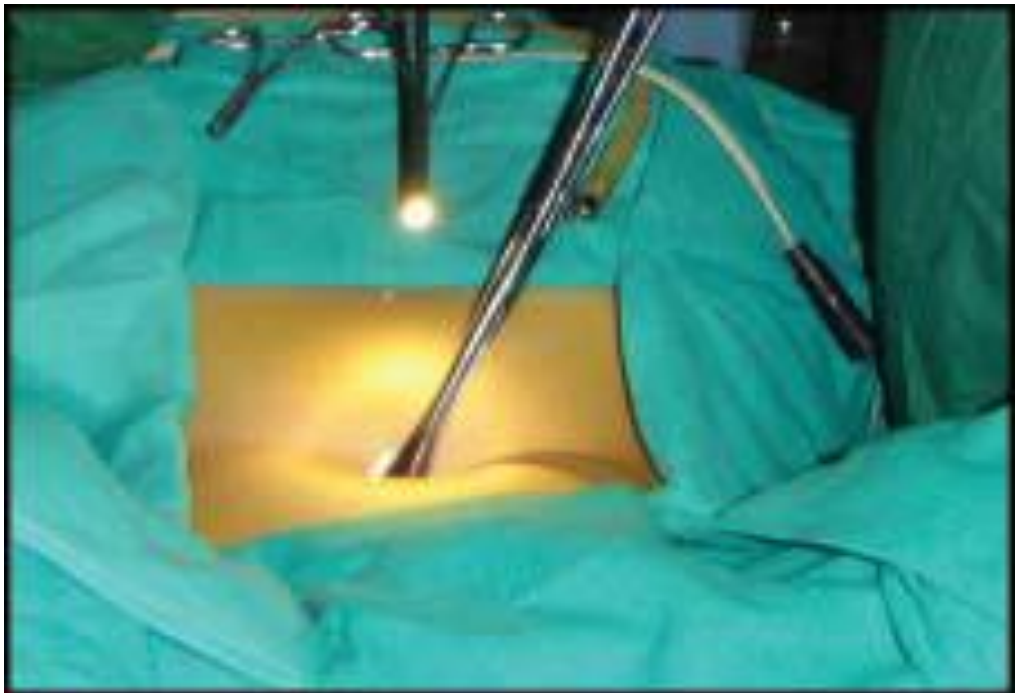
SITE OF VERRESS NEEDLE ENTRY

Umbilicus is safe site for access as discussed earlier.

But the following precautions should be taken to prevent infection (as dirty skin of umbilicus) and ventral hernia.

Precautions :

1. Umbilical area must be thoroughly cleaned



Cleaning of umbilical area with light

2. 10mm port should be sutured in layers to prevent incisional hernia.
3. Maintaining proper hemostasis to prevent hematoma
4. An endobag should be used for the removal of the infected material , this will help in preventing port site infection

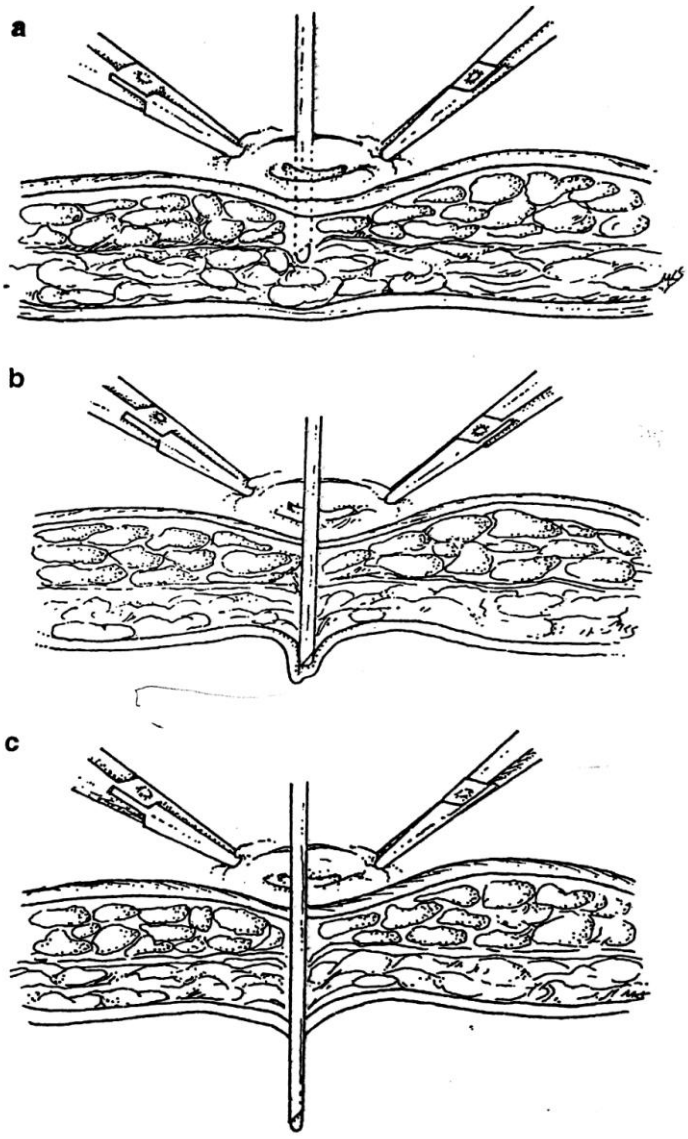
Where in umbilicus :

1. In normal BMI patients Supra or infraumbilical
2. For obese patients it is better through transumbilical.

3. In obese patients, the veress needle should be inserted perpendicular to anterior abdominal wall as there is chance of creation of preperitoneal insufflation.
4. Transumbilical in case of diagnostic laparoscopy under local anaesthesia.

Stabilisation of umbilicus

Umbilicus should be held with two Ellis forceps as shown in the picture.



Introduction of veress needle

After holding the umbilicus with Ellis forceps, the crease of the umbilicus is everted, a stab incision is made with 11 size blade supraumbilically or infraumbilically.

The incision should not reach rectus.

Veress needle Introduction:

By grasping shaft like a dary as shown in the figure , needle is inserted through the incision at 45 degrees elevation angle as distal end of veress needle should be pointed towards anus, in asthenic or minimally obese patients.

But in obese patient the needle is inserted perpendicularly.

Full thickness anterior Abdominal wall is lifted with the help of assistant , Verres needle is inserted to prevent vessel or bowel injury.

Lifting of anterior abdominal wall also prevents preperitoneal slip and allows perpendicular elevation angle

When the needle passes through the anterior abdominal wall it makes click sounds when piercing anterior , posterior rectus sheaths and finally peritoneum.

At umbilical level it will give only two click sounds as both rectus sheaths fuse here.

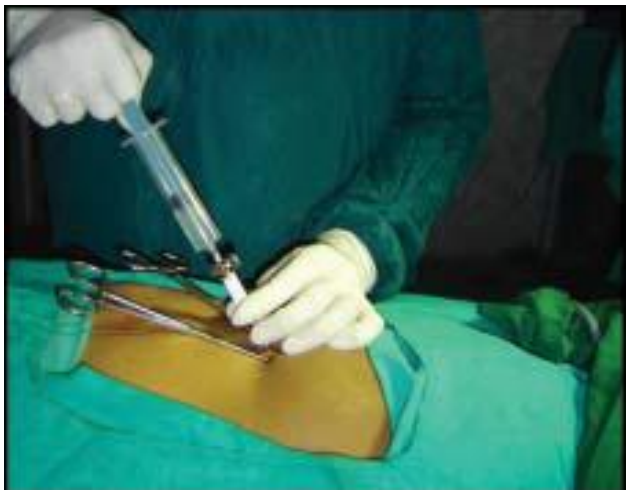
Other areas will produce three sounds.

Pushing of veress needle should be stopped once these two click sounds are felt, to prevent laceration of bowel or vessel.

Indicators of safe veress needle insertion :

A syringe with saline connected to the inserted Veress needle. Tests are done to ensure the correct position of the needle.

a. ASPIRATION TEST - Contents to be examined for the presence of body fluids



b. IRRIGATION TEST: Free flow will ensure intraperitoneal position.

c. Again ASPIRATION TEST. No saline should come back if the needle is intraperitoneally.

d. DROP TEST and HANGING DROP TEST

Once the fluid in the hub flows well the needle is intraperitoneally.

If there is no such flow – the needle may be extraperitoneally or inside the viscera .-HANGING DROP.

Creating Pneumoperitoneum :

Co2 insuflating tube is connected to the Verress needle , before this the intraperitoneal position of the needle should be ensured with the above said test.

The following parameters should be considered while creating pneumoperitoneum.

The parameters are :

1. Preset Pressure
2. Actual Pressure
3. Flow Rate
4. Total volume

Actual Pressure will go up with CO2 flows inside the peritoneal cavity.

If the CO2 does flow into the peritoneal cavity ,even with the flow of 500ml of CO2 the pressure of actual state will be as same as the preset pressure value that is 11 mm of mercury- this means the CO2 is flowing extraperitoneally or flowing into the intestine.

In case of leakage or flowing into vessel there will not be abdominal distension even the CO2 flow crosses 4.5 litres

.

PRESET PRESSURE

This is determined by the surgeon before peritoneal insufflations.

This pressure will be adjusted prior to CO2 insufflation and set to maintain intra peritoneal pressure optimally around 11mm and not crossing 18 mm of mercury.

If intraperitoneal pressure goes down the insufflator will push CO2 , and aspirate the CO2 once the intraperitoneal pressure goes up to hold the pressure that is equal to preset pressure.

In case of laparoscopy for diagnostic purpose without General anaesthesia ,this must be around 8 mm of mercury. In arthroscopy and axilloscopy it can be more than 19mm of mercury.

Actual intraperitoneal pressure :

Measured by insuffalator

The ADVERSE EFFECTS of high actual pressure (that is higher than 20 milli meter of mercury)

1. Deep vein thrombosis
2. Low cardiac output
3. Reduced tidal volume
4. High chance of Air embolism
5. High chance of surgical emphysema.

Flow Rate of CO2 :

This is the flow rate of CO2 .The initial flow rate should be One litre per minute, as the verres needle may be entered into the vascular structure- with this flow rate the occurrence of air embolism is low.

After creating initial level of pneumoperitoneum and with the intraperitoneal placement of cannula the CO2 flow rate can be increased maintain the intraperitoneal pressure inspite of CO2 loss during the procedure.

The maximum CO2 flow rate should be 2.5 lit per minute.

Hypothermia will occur if the flow rate is higher than 7litres per minute.

TOTAL CO2 USED :

15o ml of CO2 in the peritoneal cavity will obliterate the liver dullness.This is one of the indicators of insufflations.

Normally the peritoneal cavity requires 1.5 litres of CO2 to attain 12 mm of mercury actual pressure. But higher volume may be needed for large peritoneal cavity, even upto 5 litres.

PRIMARY TROCAR INSERTION

Injuries occur during trocar insertion are mainly due to

1. Insufficient anterior abdominal wall stabilization.
2. More resistance to the needle .
3. Improper and much force by the surgeon with the needle.

These factors may be overcome by

1. Adequate muscle relaxation.
2. Adequate insufflations.
3. Adequate skin incision.

TROCAR WITH CANNULA:

Available in varies sizes.

Tip may be rounded, cone shaped or pyramidal shaped

Provided with valve and tap for inflow or out flow of gas.

Disposable one has Flap valves with safety system.

The latest disposable trochar and cannula is of spring type.

PRIMARY TROCAR INSERTION IN CLOSED METHOD:

Position of the patient – Supine with head down

Site and incision – Usually infra or supraumbilical and transumbilical in obesity. The 1mm stab incision is made for verress needle. After creating pneumoperitoneum , the one mm stab incision is enlarged to 11 mm for the insertion of primary trochar.

INSERTION OF PRIMARY TROCAR.

Trocar is held in a correct position as shown in the figure.

Entire thickness of the anterior abdominal wall is lifted

The angle of insertion of the trocar is between 60 and 70 degrees.

SIGNS OF ENTRY OF THE PRIMARY TROCAR:

1. Audible click sound
2. Gas escape sound
3. Feeling the loss of resistance

Trocar is withdrawn leaving the cannula. The cannula is slightly pushed into the peritoneal cavity. Insufflator is connected again. Telescope is inserted through the cannula . The area near the port site is examined for any injury.

WORKING PORTS

Avascular place for the secondary port is selected by illuminating the anterior abdominal wall with the tip of telescope .First the trochar is inserted vertically , after seeing the trochar tip in , the trochar is inserted in the direction that is facing the anterior abdominal wall to avoid visceral injury.

OTHER PORTS

Other trochars are introduced in places according to the pathology and anatomy with direct vision.

The distance between the two ports should not be below 5cm.

Closed Access technique

This is the oldest technique with Verres needle.

The complications associated with this technique are injury to major blood vessels, bowel injury and preperitoneal insufflations.

Open access technique

4) Hasson technique.

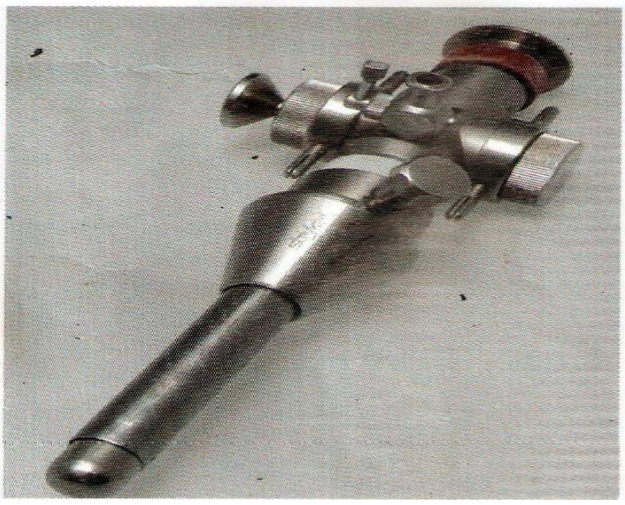
5) Fielding technique.

6) Scandinavian technique.

Open access technique- The concept in this technique is creating tiny transverse incision, incising the layers of abdominal wall and directly entering into the abdomen.

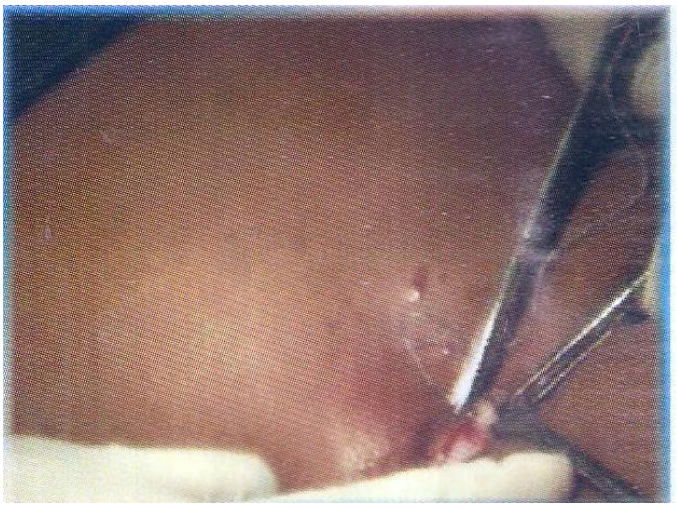
Hasson technique

This is an open access trocar method ,which was introduced by Hasson in 1974.

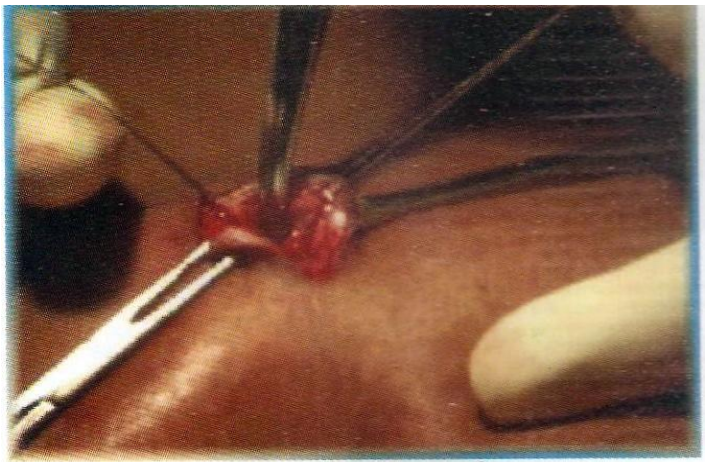


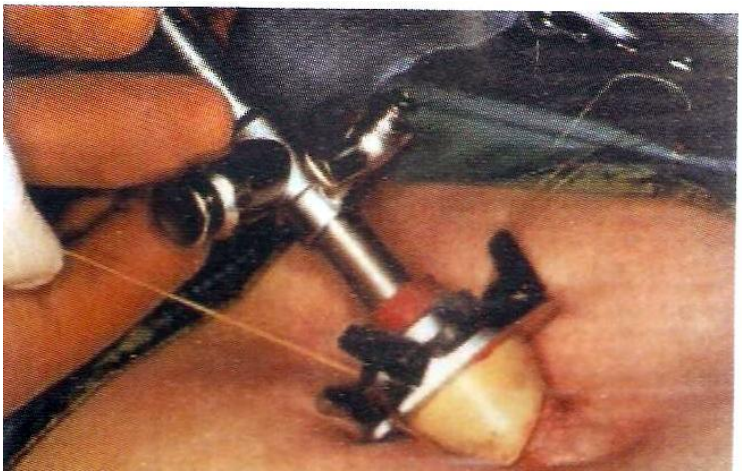
A transverse incision around 2.5 cm is made supra (or) infraumbillically (or) Transumbilically.

After retracting the upper and lower skin flaps, dissection of subcutaneous tissue is proceeded up to the rectus sheath. Stay sutures are given o the both end of the transverse incision, rectus sheath is incised after elevating the rectus by pulling the stay sutures.



Peritoneum should not be breached with the above said incision, while holding the stay sutures up, a hemostat is stabbed with the peritoneum. The peritoneum is opened with an artery forceps carefully. The peritoneal breach is expanded with the artery forceps. If any adhesion, felt by a finger inserted through the incision , it should be released with blunt dissection by that finger with care and not to damage the underlying structures within the adhesion.





The Hasson canula is passed through the above said incision, into the peritoneal cavity with care. The cannula will dilate the smaller incision to give an airtight fit.

If the incision is big to hold the port in proper position stay sutures may be given to hold the cannula.

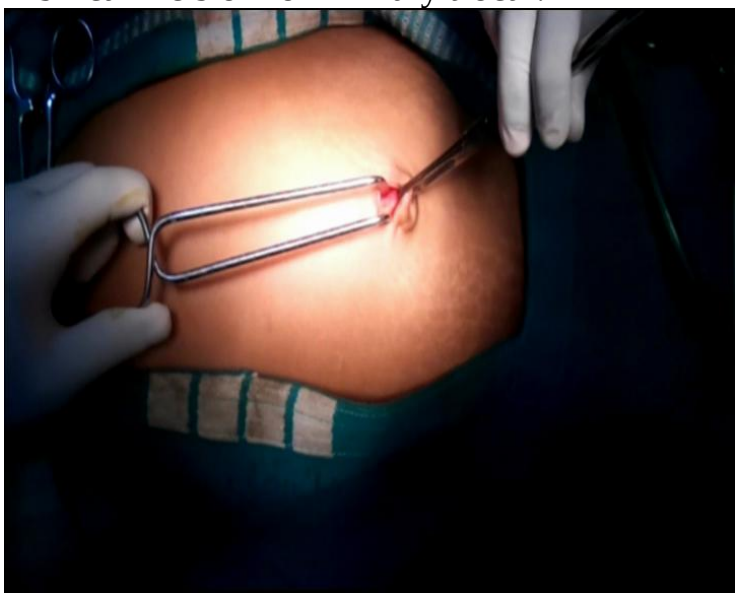
Pneumoperitoneum is created under direct vision.

Open technique

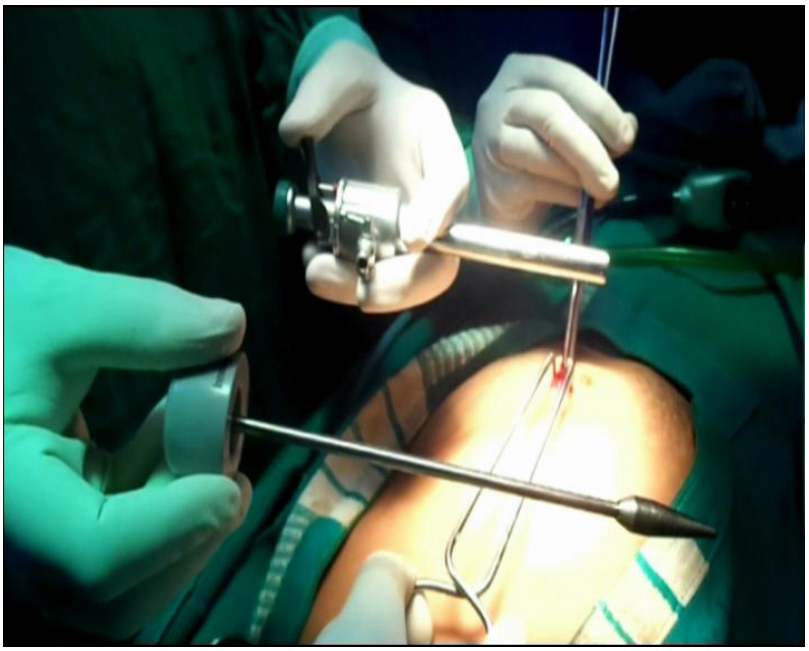
In this technique a small 10mm transverse skin incision is made supraumbilically, which will show the junction of the base of umbilicus with the linea alba. A tiny slit is made vertically at this junction using 11 size blade. A specially designed cannula with blunt and cone shape tipped trocar is inserted through the above said slit , which will dilate the small slit and enter into the peritoneal cavity safely with air tight. There is no need for fascial sutures.

OPEN ACCESS METHOD

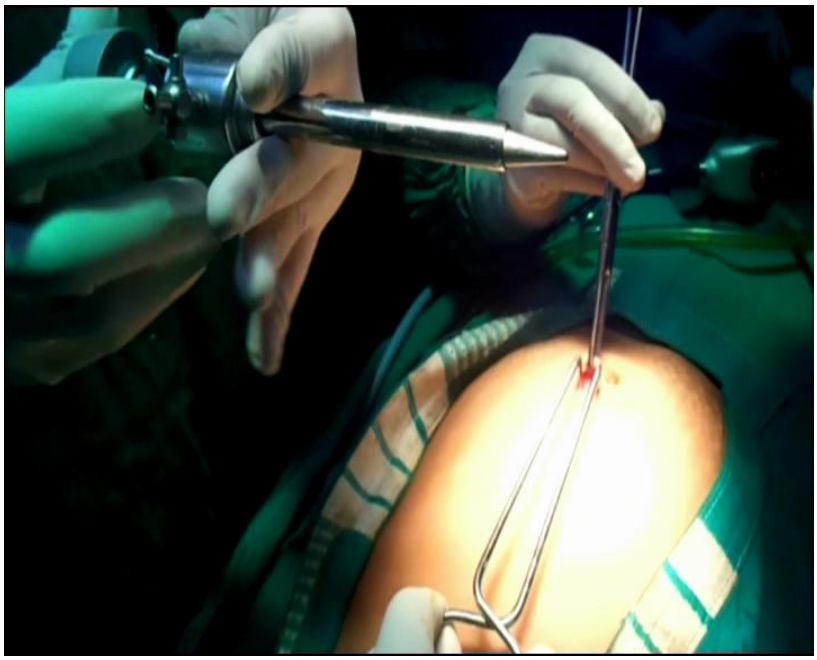
Supraumbilical incision for Primary trocar.



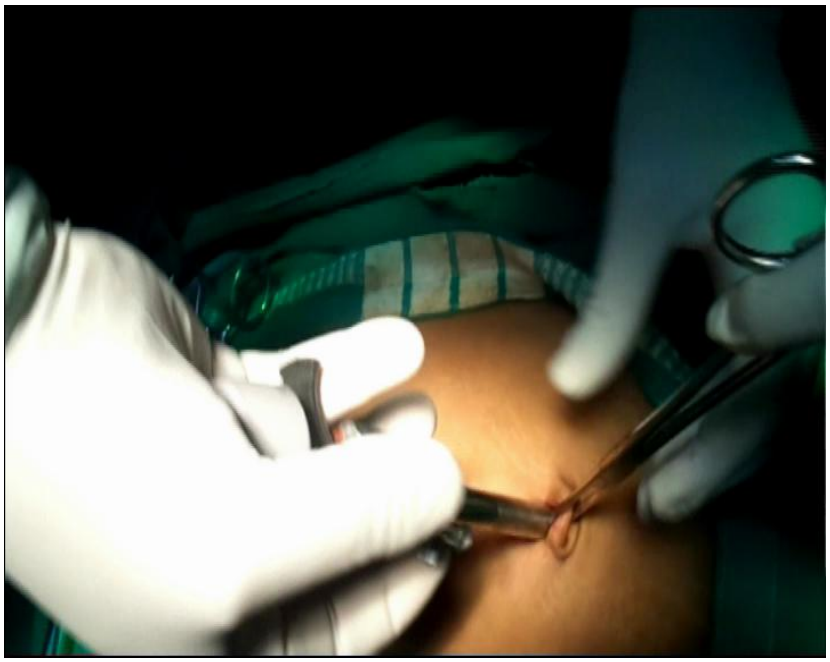
Incision being dilated to expose the junction point of base of the umbilicus with the linea alba.



Blunt conically tipped trocar with cannula.



Trocar with cannula being passed through the slit .



Primary port

Advantages of open technique over closed technique

1. Major vascular injury is very less .
2. Injury to Bowel and other solid organs are very less when compare with closed access method .
3. Preperitoneal insufflation is least in open method.
4. Small Port site incisions can be closed in layers, thus preventing incisional hernia.
5. Suitable for patients known to have peritoneal adhesion and TB abdomen.
6. It is safe for patients who underwent any abdominal surgery.
7. Safe for pregnant patients.
8. Safe for patients with low BMI – Thin built.
9. Safe for Pediatric age group.
10. Invidence of gas embolism is very loss.

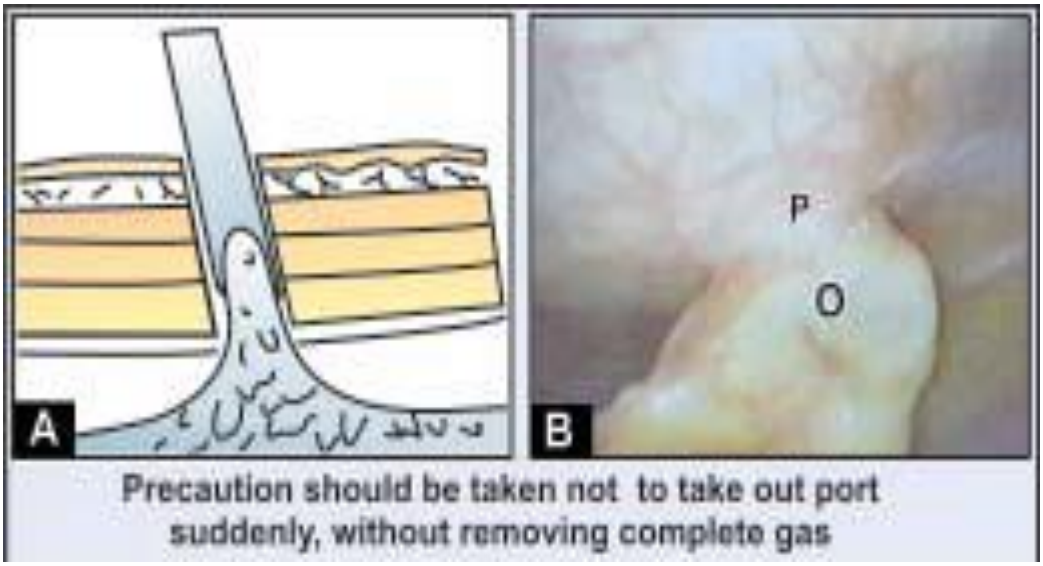
Contraindications for primary port through Umbilicus:

1. Old incisional scar in the midline.

2. Patients with Portal hypertension

3. Abnormalities like urachal cyst, sinus or paraumbilical or umbilical hernia

INSTRUMENT AND PORT REMOVAL



After procedure is over , instruments must be removed carefully under vision.

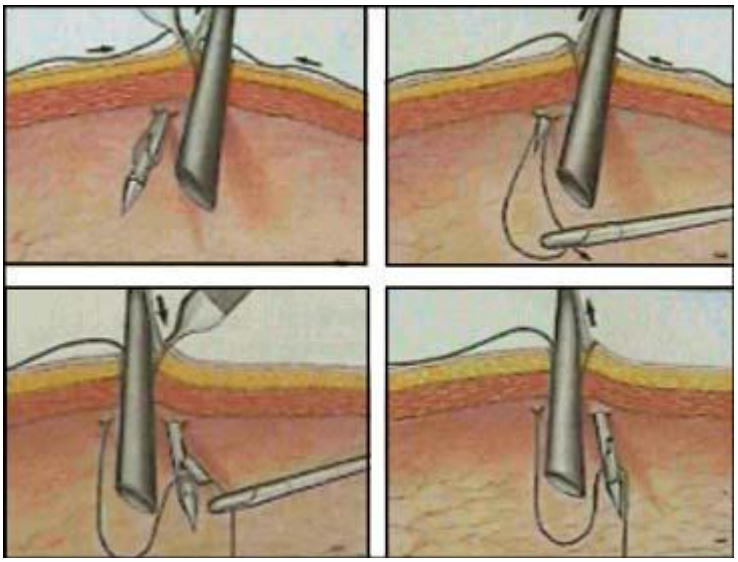
First the Accessory ports should be removed ,

CO2 is allowed to escape through the 10mm primary cannula by applying gentle pressure over the anterior abdominal wall.

Primary port must be removed finally after ensuring the total escape of CO2.

The primary port should be taken out in the end and it should be removed slowly because it may pull the intestine or omentum through the primary port site. This may lead to adhesion or hernia. It is better to keep any blunt instrument in the primary cannula when removing the same.

CLOSURE OF PORT SITES:



The ports of size 10 mm and more than this must be sutured in layers to avoid incisional hernia. Only skin suturing is enough for 5mm ports.

EFFECTS OF PNEUMOPERITONEUM:

Deep vein thrombosis

Arrythmias

Hypothermia

Lung insuffiency

Gas embolism

Glaucoma

Preperitoneal insufflation

LAPAROSCOPY IN SPECIFIC CONDITIONS

Local anaesthesia and Diagnostic laparoscopy

Under IV sedation the procedure is done

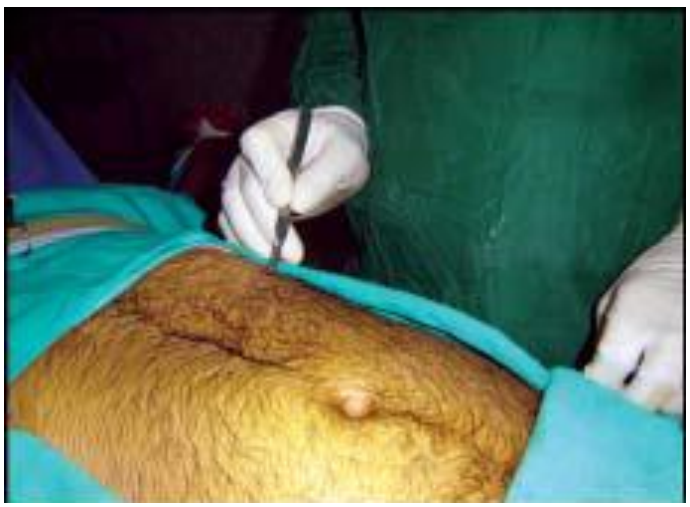
Verress needle and trocar must be introduced vertically into the abdomen.

The flow rate should be 0.5 lit. per minute

The pre set pressure should be less than 8 mm of mercury

As Nitrous oxide has analgesic property , it may be used

PALMERS TECHNIQUE



Veress needle is inserted through a tiny stab incision in the left hypochondrial region. This technique is useful for the patients with urachal cyst, umbilical hernis or urachal sinus.

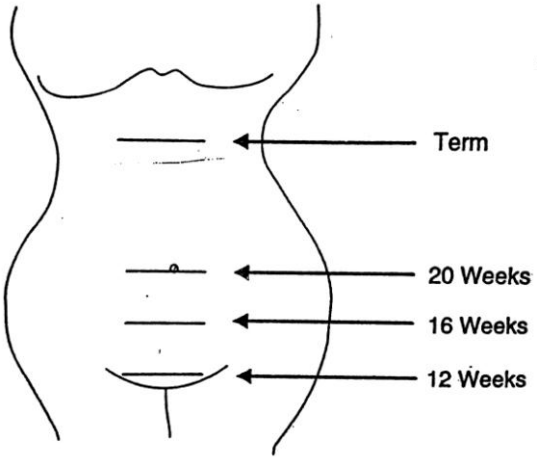
PORT ENTRY FOR OBESE PATIENTS

The primary port site is transumbilical in obesity for closed access technique as the thicknesss of the anterior abdominal wall is less.

The veress needle is introduced vertically into the peritoneal cavity.

The preset pressure in obesity is around 19 mm of mercury and flow rate also should be more

LAPAROSCOPY DURING PREGNENCY



. Fundal height at advancing stages of pregnancy.

Pregnant patients may suffer from acute abdominal conditions like acute appendicitis and cholecystitis commonly.

Early surgical intervention will avoid maternal and fetal morbidity and mortality.

Recent studies and reports reveal that the laparoscopic surgery is safe for pregnant patients.

Essential Precautions:

Close monitoring of fetal heart rate.

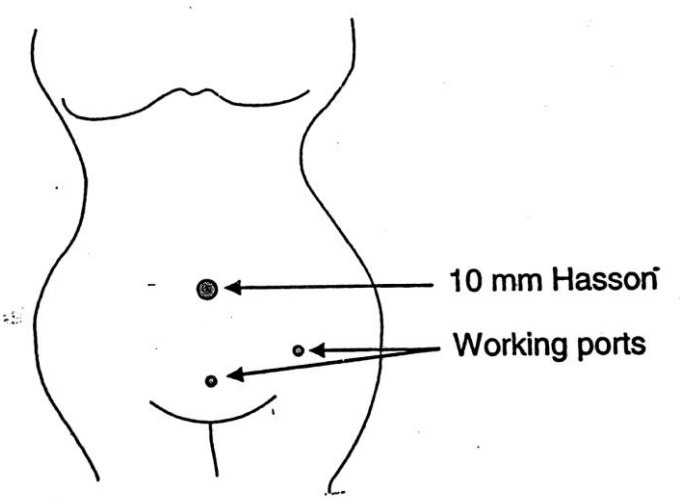
If there are signs of fetal distress due to hypoxia, the CO2 flow is reduced to minimize the pneumoperitoneum soon. Mothers oxygenation is improved to normalize the fetal heart rate.

Pneumocompressive devices and Injection Heparin may be used postoperatively to prevent Thromboembolic episodes as these patients are prone for such complications.

POSITION OF THE PATIENT

Left lateral position

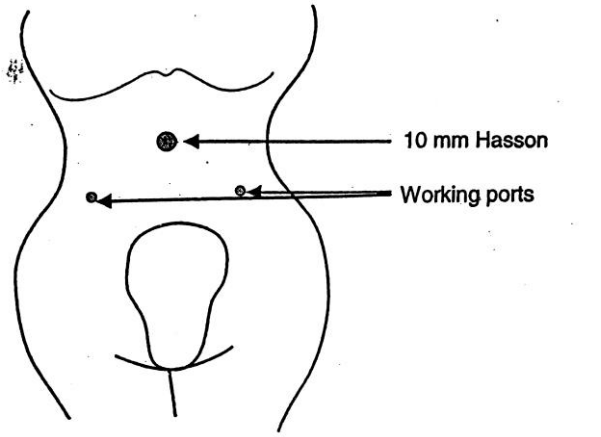
ACCESS IN TO THE ABDOMEN



2. First trimester trocar placement for laparoscopic appendec

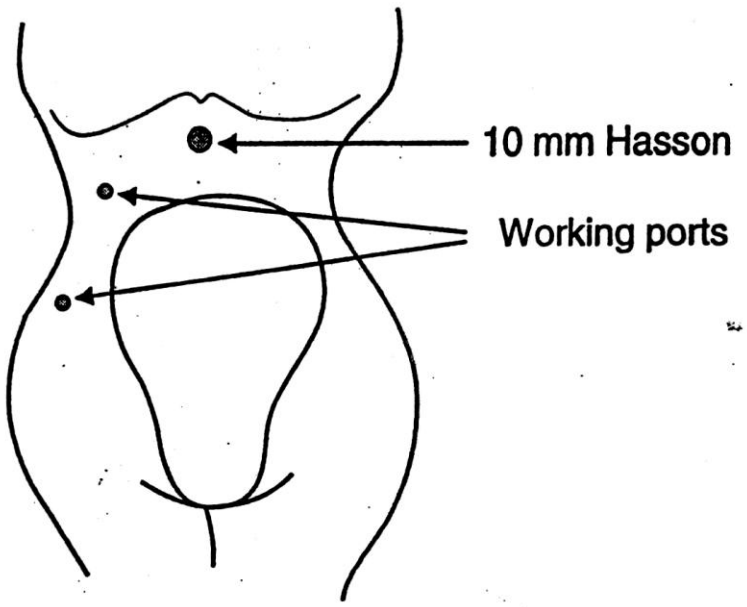
Laparoscopic appendectomy in first trimester.

Open access technique will be the safest one in pregnancy according to the studies. In closed method the use of optical trocar is safe. Open technique will be better than Hasson.



Second trimester trocar placement for laparoscopic appendectomy

The placement of trocar depend on the fundal height in pregnancy Primary trocar is made according to the fundal height for any laparoscopic surgery.



Third trimester trocar placement for laparoscopic appendectomy.

The working ports in cholecystectomy may be made in the usual places. But the working ports are made for appendectomy will vary with size of the uterus as shown in the following pictures

It is safe to have insufflation pressure around 12 mm of mercury.

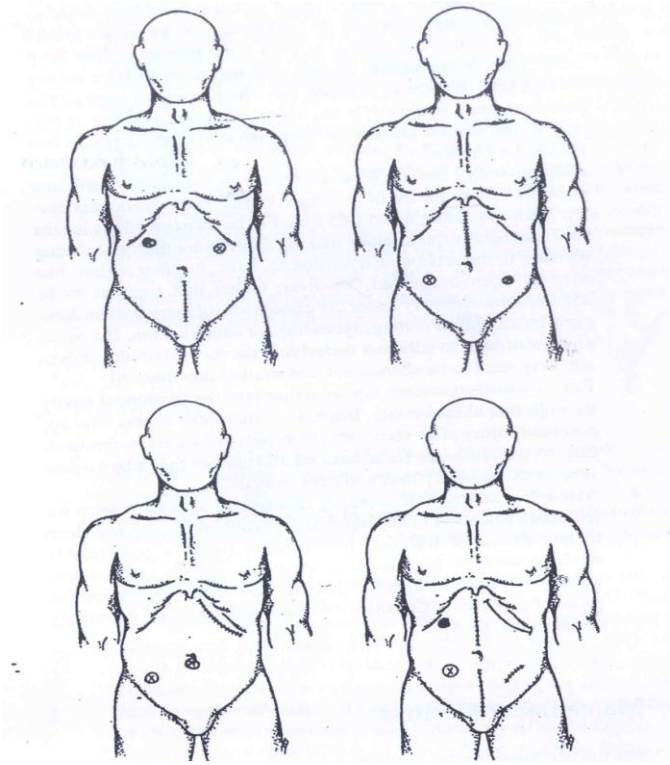
LAPAROSCOPY WITH PREVIOUS ABDOMINAL OPERATIVE SCAR

The patients with such condition should be assed clinically and radiologically for further plan.

Open access methods particularly open technique will be the choice in this condition. Veress needle with optical trocar may be used.

In closed technique the tests for intraperitoneal positioning of the needle should be done.

The primary trocar site should be safely away from the previous scar. Generally the port sites should be placed according to the old surgical scar as shown in the pictures.



If any adhesion seen while putting primary trocar , it should be stopped and any other location should be selected for the same.

Release of adhesions may be done with much care after the safe entry of primary trocar. Monopolar cautry should be used for this purpose.

There should be no hesitation in converting the procedure to open surgery in any difficult situation.

EMERGENCY LAPAROSCOPY

Emergency laparoscopy is use full in the following conditions:

Right iliac fossa pain in female patients to exclude gyanec conditions and to avoid negative appendectomy.

Right hypochondrial pain to rule out Acalculus cholecystitis

Intestinal obstruction

Unexplained GI bleeding

Ischaemia of bowel and mesentry

Intraabdominal Abscess - inaccessible for imaging

Pyrexia of unknown origin.

Blunt injury to abdomen

Abdominal penetrating injury

SCOPE TO BE USED

0 and 30 degree scopes can be used . 30 gegree scope is used to view the corners.

LAPAROSCOPY FOR PATIENTS WITH BLUNT INJURY

As peritoneal insufflations may rise the ICT, it should be used with care for patients with head injury.

Free fluid in the abdomen in the absence of solid visceral injury laparoscopic evaluation may be needed for bowel injury when imaging fails.

To evaluate diaphragmatic injury

LAPAROSCOPY IN ABDOMINAL STAB INJURY

All abdominal stab injuries do not require laparotomy.

Laparoscopy may be needed to rule out peritoneal breach in tangential stab or stab in the flank

Skin should be closed with sutures at entry site of stab wound for insufflations

COMPLICATIONS OF LAPAROSCOPY IN TRAUMA

Hypothermia

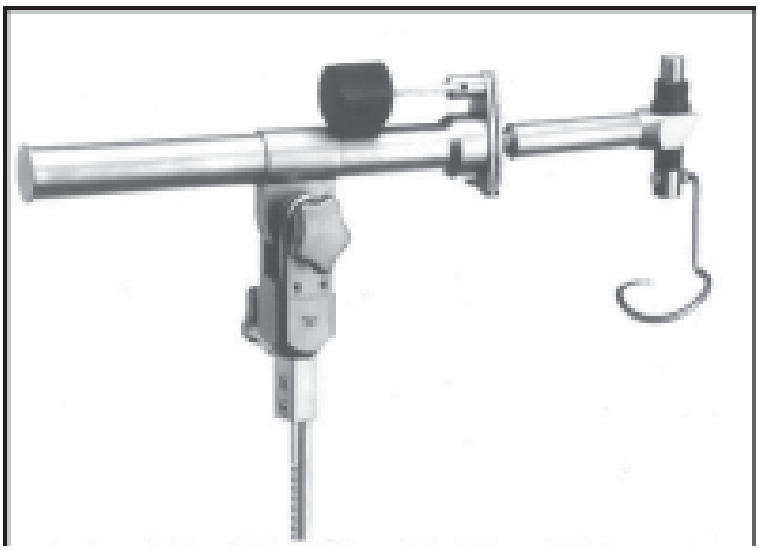
Rise of ICT in head injury

Occult diaphragmatic injury may lead to pneumothorax.

GASLESS LAPAROSCOPY

With the use of anterior abdominal wall lifting mechanical devices Gasless laparoscopy is performed for the patients who are not suitable for pneumoperitoneum.

It can be used alone or with low insufflations



It will not give a complete intraperitoneal space to operate when compare with gas. It simply lifts the anterior abdominal wall. Pressure necrosis is the adverse effect. It is difficult to perform.

LITERATURE REVIEW

COMPARISON OF TWO ENTRY METHODS FOR LAPAROSCOPIC PORT ENTRY:-

Ariana Tor, G'ovanni Cappello, Maurisio, Andrea Di Stefano, and Isidoro Di carlo. Departmental of surgical sciences University of Catania. Italy, April 2012.

Access into the abdomen is the one challenges of Laparoscopy that is insertion of surgical instruments through small incisions.

Complications, from laparoscopic surgery are rare but commonly occur with access into the peritoneal cavity.

Access is associated with injuries to the major blood vessels and Gastrointestinal tract.

The incidence of vascular Injuries is 2 in 10,000 procedures and serious complication associated with mortality is 3.3 per 100000.

Finding a safe access technique is the priority for the life of the patient and also for the increasing rate.

There are two methods in creating pneumoperitoneum- closed and open technique.

Verres needle – Closed technique.

1. Oldest method
2. Easy, fast and effective.
3. Injury to the major blood vessels may occur.
4. Traditional texts recommend an insertion angle of 45 degrees from horizontal in patients with body mass index less than 30 kg/m2 to avoid vascular injury.
5. Different methods are reported for safety like angling of needle, saline drop test, spinal needle test, PUGSI – Periumbilical ultrasound guided saline infusion and CT (or) MRI.

    - Adhesion of intestine can be detected by ultrasound.
    - Patients with previous abdominal surgery are more prone for visceral injury caused by verres needle.
    - Autopsy have found adhesions in 74 to 95% patients with previous abdominal surgery.
    - The controversy of this closed technique is the need for MRI.

Hasson technique

The concept in this technique is to create a small incision, directly open the layers of abdominal wall and enter the abdomen. To prevent the gas escape around the incision, an Olive is placed at the end of the trocar to occlude the incision and sutures are placed on the fascia of abdominal wall and the sutures are tied with the cannula.

The benefits are avoidance of bowel injury, visceral injury preperitoneal insufflations and gas embolism. A correct anatomical repair of incision is possible.

Wide spread use of this open technique is limited to patients with previous lower abdominal surgery, pregnant women, children and thin individuals.

Meta analysis of 760890 closed Laparoscopy and 22465 open cases reported, the incidence of vascular injury rate in closed technique was 0.44% and 0% in open technique.

In case of bowel injury it was 0.7% for closed and 0.5% in open technique.

General surgeons in Canada used Hasson open technique. Out of 2010 patients, there were no fatal vascular injury, low risk of enterostomy and comparable rates of umbilical infection (or) hernia associated with open technique.

- Chapron et al., reported- the bowel and major vessel injury rate were 0.04% and 0.01% in closed technique, and 0.09 and 0% in open technique and respectively.

Catarci analysis report

The incidence of major injuries in

optical trocar - 0.27%

Closed technique - 0.18%

Open technique - 0.09%

The rate of gas embolism was 0.001% out of 489335 closed technique. Gas embolism has not been reported at open laparoscopy. Another new technique consists transverse. Supra umbilical incision showing the junction of umbilical cicatrix pillar and line alba. After putting incision of size 10mm, at this junction allows the peritoneal cavity open, without the requirement of fascial sutures. It is safe, effective, quick to perform and easy to learn.

WORLD LAPAROSCOPY HOSPITAL

Gurgaon, Delhi- India

Hasson trocar technique was developed initially for patients with previous laparotomy.

After experiencing the benefits of this technique, this technique is being routinely used for all patients.

In Laparoscopy hospital, we have changed the closed verres needle technique to open technique. In which small entry incision is made, through scar tissue of the umbilicus and then dilating this by passage of a blunt trocar preferably conically tipped trocar and cannula. This method does not need fascial sutures.

In this technique complications are very less.

It is safe and easy to perform.

Time taken is less.

Small incision is required when compare with Hasson hence avoidance of incisional hernia.

Fascial sutures are not required.

No preperitoneal insufflations.

AIM OF THE STUDY

The aim of the study is to compare peritoneal access with open vs closed technique in laparoscopic surgeries in terms of outcomes and complications.

PRIMARY OBJECTIVES

- To compare the rate of occurrence and nature of complications in open and closed laparoscopy during establishment of pneumo peritoneum in different surgical procedures.

METHODOLOGY

This is a prospective study involving patients presenting with acute or chronic abdominal conditions like calculus cholecystitis, cholelithiasis, acute or subacute or chronic appendicitis, carcinoma rectum etc at Govt Rajaji Hospital, Madurai. In this study 50 patients underwent laparoscopic surgeries for the above said condition with open access technique and 50 cases underwent closed techniques This study is done between September 2017– August 2018.

MODE OF SELECTION:

100 cases with acute or chronic abdominal conditions like cholecystitis, cholelithiasis, appendicitis, ca rectum etc without co morbidities were selected and studied in detail. A structured proforma was used to collect relevant information for each individual patient selected. Data was entered in the master chart for the analysis. Data is analysed by using unpaired ‘t’ test and ‘chi square test’. Cases were selected with the following inclusion and exclusion criteria.

INCLUSION CRITERIA

Age more than 18 years in both sexes presenting with acute or chronic abdominal surgical conditions.

Without co-morbidity

Consented for inclusion

EXCLUSION CRITERIA

Patients less than 18 years of age

With co-morbidity contraindicated for laparoscopy

Patient not consented.

RESULTS

TABLE – 1

AGE DISTRIBUTION

AGE	CLOSED METHOD		OPEN METHOD	
	No Of CASES	%	No Of CASES	%
≤ 25	3	6.00	3	6.00
26 - 50	41	82.00	35	70.00
>50	6	12.00	12	24.00
TOTAL	50	100.00	50	100.00

Maximum patients were between 26 and 50 years of age.

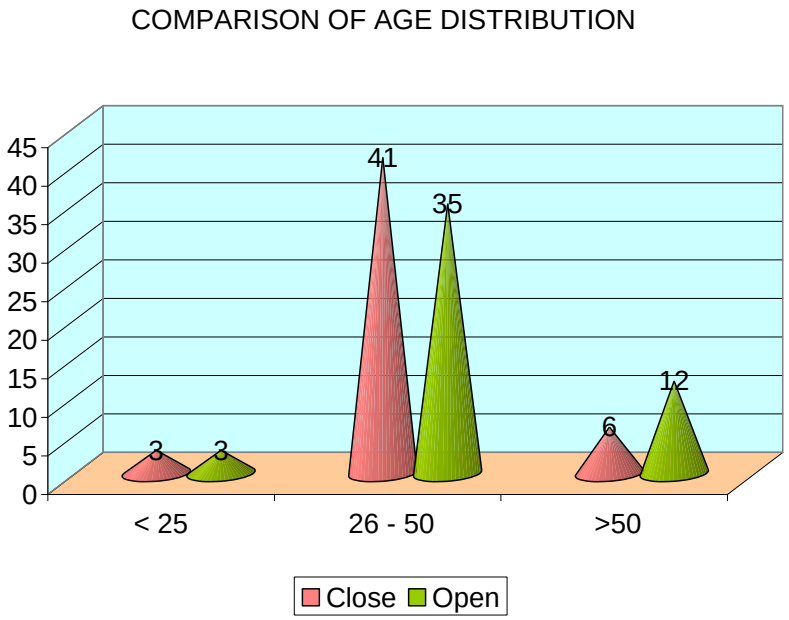


TABLE – 2

SEX DISTRIBUTION

SEX	CLOSED METHOD		OPEN METHOD	
	No Of CASES	%	No Of CASES	%
MALE	40	80.00	41	82.00
FEMALE	10	20.00	9	18.00
TOTAL	50	100.00	50	100.00

81 Percentage of the patients are males

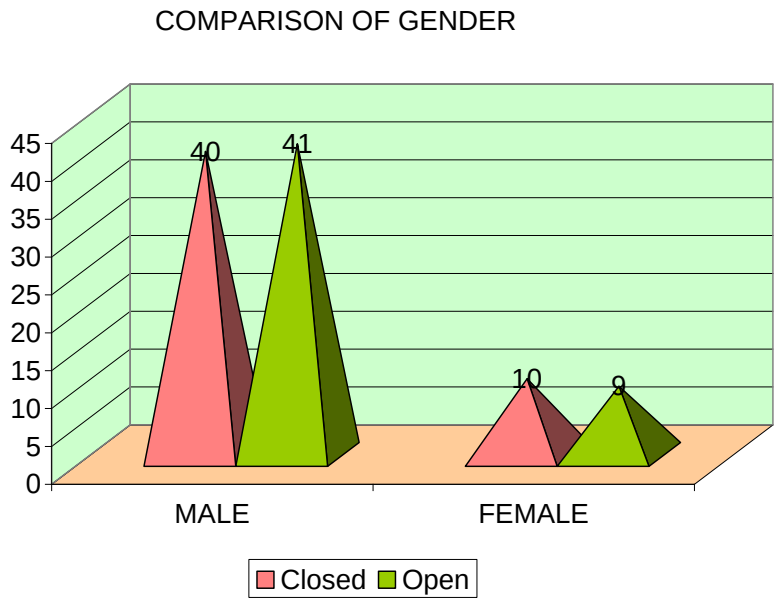


TABLE – 3

DIAGNOSIS

Diagnosis	Closed	Open
TB abdomen	6	4
Acute on chronic appendicitis	2	3
Acute appendicitis	4	5
Calculus cholecystitis	8	7
Carcinoma rectum	2	2
Cholelithiasis	6	5
Chronic appendicitis	2	2
Liver abscess	2	2
Pos LSCS sinus tract	2	1
Sub acute appendicitis	14	16
Varicocele Lt	2	3
Total	50	50

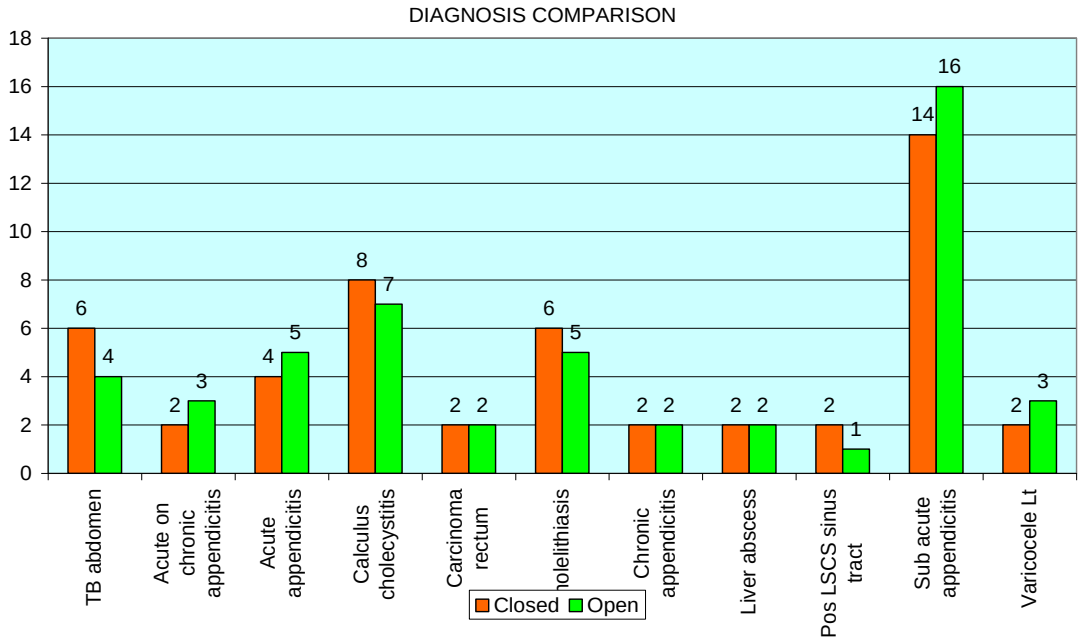


TABLE – 4

PROCEDURE

Procedure	Closed	Open
Lap. Appendectomy	22	20
Lap. Cholecystectomy	14	15
Diagnostic Lap with omental Biopsy	6	5
Lap excision at sinus	2	2
Lap. Liver abscess	2	3
Lap Varicosetecomy	2	2
Lap APR	2	3
Total	50	50

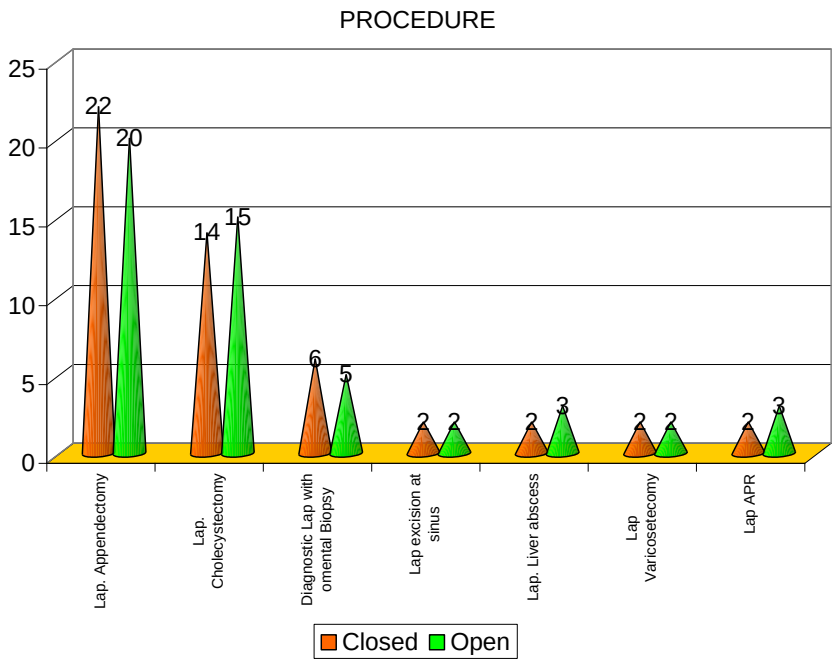


TABLE – 5

PROCEDURE

Procedure	Closed	Open
Lap. Appendectomy	30	28
Lap. Cholecystectomy	44	40
Diagnostic Lap with omental biopsy	22	20
Lap excision of post LSCS sinus	45	43
Lap. Liver abscess drainage	28	25
Lap Varicocelectomy	30	30
Lap APR	150	145

Minimum time taken for the procedure is 200 minutes for diagnostic laparoscopy with omental biopsy in a suspected TB abdomen patient. The maximum time taken was 145 minutes for Laparoscopic APR for carcinoma rectum.

TABLE – 6

AGE VS RELATIVE INDICATION

	Relative Indication			
Age in years	Thin built	TB abdomen	Post LSCS	Nil
< 20	6	2	0	2
21 - 30	6	0	0	8
31 - 40	4	0	0	2
41 - 50	0	0	2	10
51 - 60	2	4	0	2
Total	18	6	2	24

Out of 50 patients 18 patients were thin built low BMI, 6 patients were with suspected TB abdomen and one patient with post LSCS sinus.

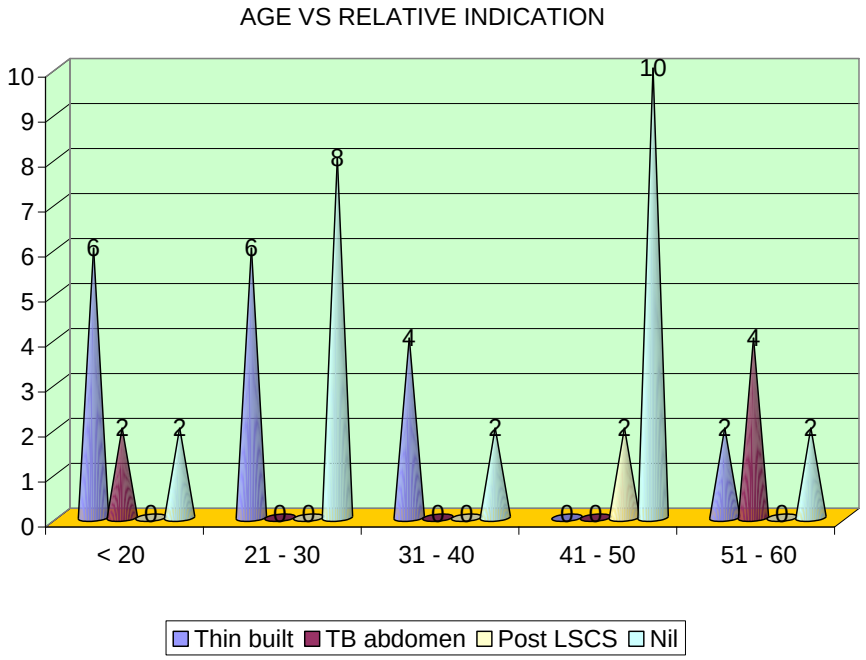


TABLE – 7

SEX VS RELATIVE INDICATION

	Relative Indication			
Sex	Thin built	TB abdomen	Post LSCS	Nil
Male	4	2	0	8
Female	14	4	6	12

18 Patients were thin built, 6 Patients were with suspected TB abdomen and 3 patients were with previous abdominal surgery.

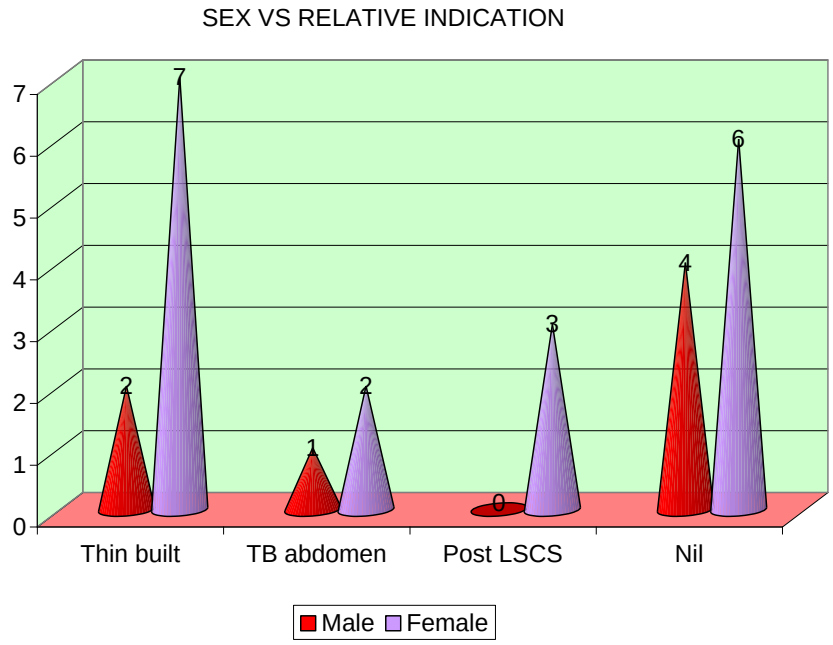


TABLE – 8

RELATIVE INDICATION

Relative Indication	No.of cases	Percentage
Thin built	18	36
TB abdomen	6	12
Post LSCS	6	12
Nil	20	40
Total	50	100

36% patients were thin built, 12% patients were with suspected TB abdomen 12% patients were with previous abdominal surgery.

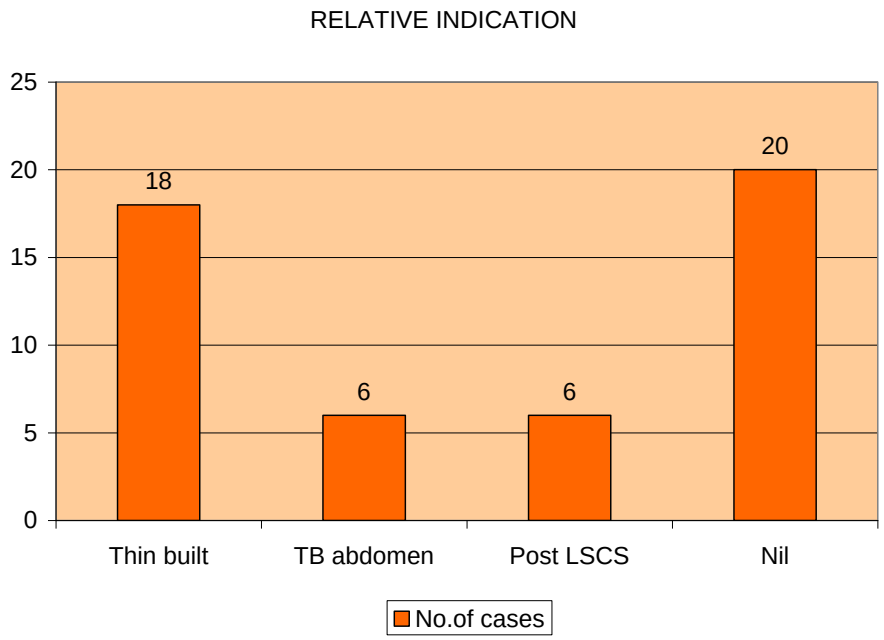


TABLE – 9

TIME TAKEN FOR PRIMARY TROCAR

Time taken for primary Trocar	Closed	Open
3 minutes		10
4 minutes		18
5 minutes	2	21
6 minutes	12	1
7 minutes	24	
8 minutes	12	
Total	50	50

The minimum time taken for primary trocar was 3 minutes and maximum time taken was 8 minutes

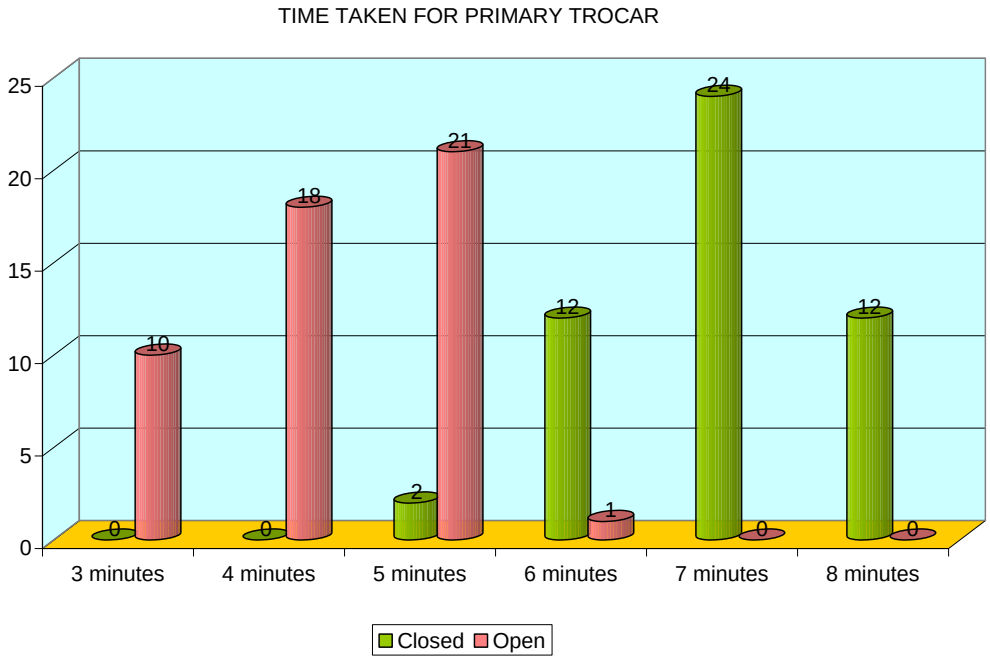


TABLE – 10

Time taken for Access (in mins)

Time Taken for Access [in mins]	CLOSED METHOD		OPEN METHOD	
	No Of CASES	%	No Of CASES	%
1 - 5	24	48.00	35	70.00
6 - 10	25	50.00	15	30.00
>10	1	2.00	0	0.00
TOTAL	50	100.00	50	100.00
Mean	5.5		4.42	
S.D	2.09		1.72	
P'	0.006 Significant			

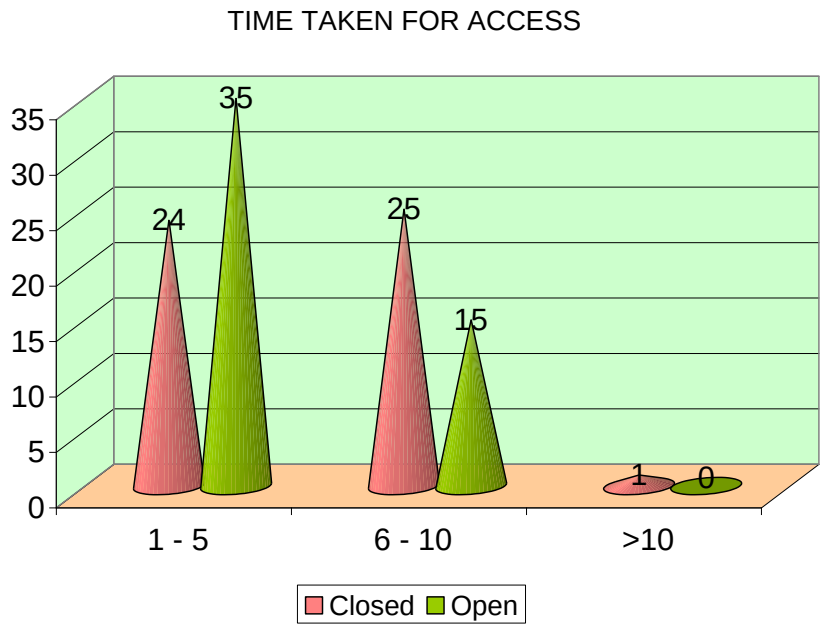


TABLE – 11

Complication at access

Complication at access	CLOSED METHOD		OPEN METHOD	
	No Of CASES	%	No Of CASES	%
Port Site Gas Leakage	5	40.00	6	42.00
Vascular Injury	0	0.00	0	0.00
Bowel Injury	1	2.00	0	0.00
Omental Injury	2	4.00	2	4.00
Extra- Peritoneal Insufflations	4	8.00	1	2.00
Gas Embolism	0	0.00	0	0.00
Loss Of Space	6	12.00	1	2.00
Entry in Wrong Plane	8	16.00	3	6.00

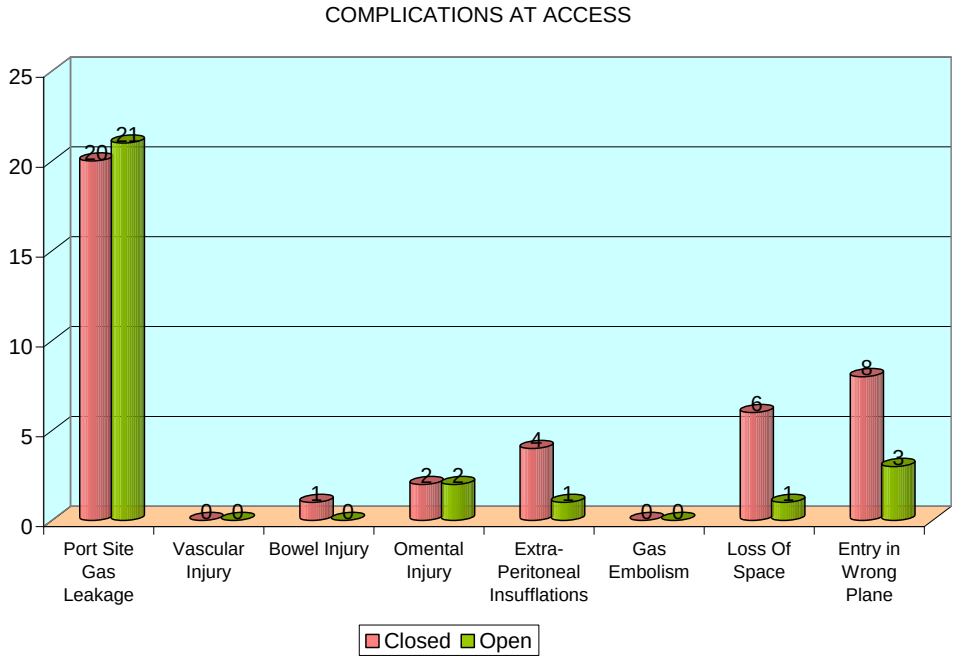


TABLE – 12

PAIN

PAIN	CLOSED METHOD		OPEN METHOD	
	No Of CASES	%	No Of CASES	%
MODERATE	19	38.00	27	54.00
SEVERE	30	60.00	22	44.00
VERY SEVERE	1	2.00	1	2.00
TOTAL	50	100.00	50	100.00

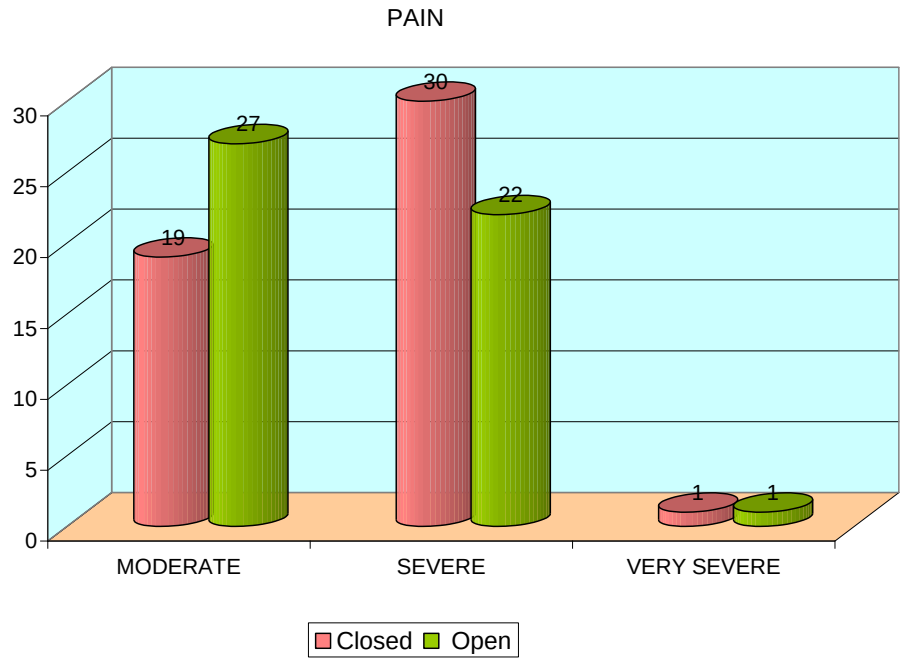
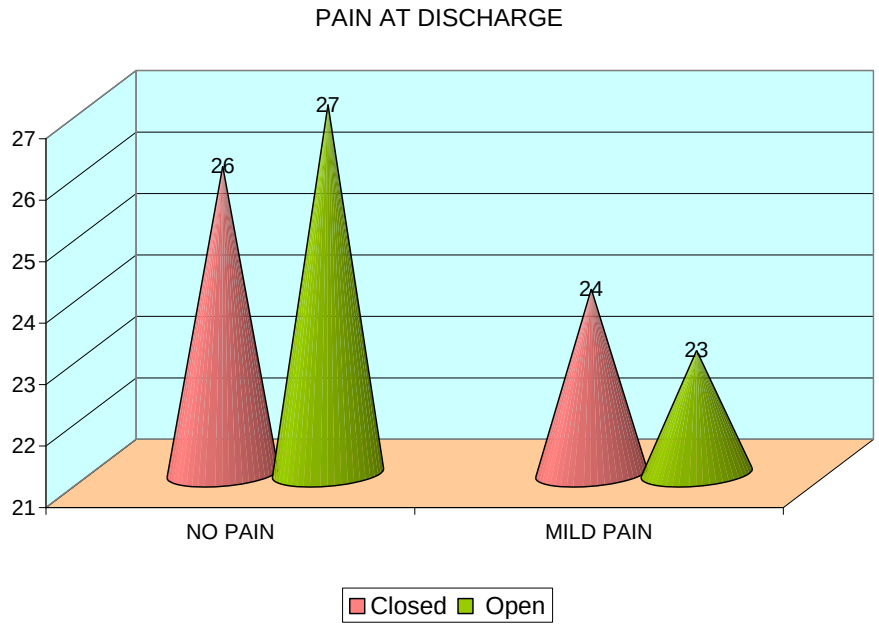


TABLE – 13

PAIN AT DISCHARGE

Pain at Discharge	CLOSED METHOD		OPEN METHOD	
	No Of CASES	%	No Of CASES	%
NO PAIN	26	52.00	27	54.00
MILD PAIN	24	48.00	23	46.00
TOTAL	50	100.00	50	100.00



SUMMARY

Totally 100 patients were studied. All 50 patients underwent laparoscopic surgery with open access technique.

Out of them, females are 72% and males 28%

In 50 patients underwent laparoscopic surgery with closed technique. Out of these, female 10 and male 40, age between 20 to 60 years.

In 50 patients underwent laparoscopic surgery with open technique. Out of these, female 9 and male 41 age between 22 to 60 years.

In closed technique, maximum 28% of patients were underwent surgery for sub acute appendicitis, calculus cholecystectomy is 16%, cholelithiasis is 12%, Acute appendicitis 8%, Carcinoma rectum 4%, TB abdomen 12%, acute on chronic appendicitis is 4%, patients with previous abdominal surgery 4% and varicose is 4%.

Out of 50 patients, 2 patients had omental injury (4%), extraperitoneal insufflation was 4 patients (8%), loss of space 6 patients (12%), entry into wrong plane was 8 patients (16%).

In open technique, maximum 32% of patients were underwent surgery for sub acute appendicitis, calculus cholecystectomy is 14%, cholelithiasis is 10%, Acute appendicitis 10%, Carcinoma rectum 4%, TB

abdomen 8%, acute on chronic appendicitis is 6%, patients with previous abdominal surgery 2% and varicose is 6%.

Maximum time taken for the primary trocar was only 8 minutes and minimum time was 3 minutes.

Maximum time taken for entire procedure was 160 minutes and minimum time taken was 30 minutes.

Out of 50 patients, none of them had intraoperative complications like Bowel injury, vascular injury, preperitoneal insufflation or gas embolism. Only one patient had minor wound infection.

According to this study, open access technique is the safest technique for all patients particularly for thin individuals, suspected TB and patients with previous abdominal surgery than closed technique.

CONCLUSION

Around 100 patients were underwent this prospective study. 50 underwent Laparoscopic surgery with open access technique and 50 underwent closed technique.

Among them 36% of patients were thin built with BMI < 20, 12% of patients were with previous abdominal surgery, 12% of patients were with suspected TB abdomen and two patients with rectal carcinoma.

In closed technique, maximum 28% of patients were underwent surgery for sub acute appendicitis, calculus cholecystectomy is 16%, cholelithiasis is 12%, Acute appendicitis 8%, Carcinoma rectum 4%, TB abdomen 12%, acute on chronic appendicitis is 4%, patients with previous abdominal surgery 4% and varicose is 4%.

In closed technique, 20 (40%) of patients were underwent laparoscopic appendicectomy, 14 (28%) of patients were underwent laparosocipic cholecystectomy, 6 (12%) of patients were diagnostic lap with omental biopsy, 2 (4%) were lap excision of sinus, 2 (4%) were lap. Liver abscess, 2 (4%) were lap varicooelectomy, 2 (4%) were lap APR.

In closed technique, Out of 50 patients, 2 patients had omental injury (4%), extraperitoneal insufflation was 4 patients (8%), loss of space 6 patients (12%), entry into wrong plane was 8 patients (16%).

In open technique, maximum 32% of patients were underwent surgery for sub acute appendicitis, calculus cholecystectomy is 14%, cholelithiasis is 10%, Acute appendicitis 10%, Carcinoma rectum 4%, TB abdomen 8%, acute on chronic appendicitis is 6%, patients with previous abdominal surgery 2% and varicose is 6%.

None of them had bowel or major vascular injury except few preperitoneal insufflations only seen.

In open technique, skin incision was only 10 mm to 20mm.

Proper anatomical repair was done for small primary trocar port. So incidence of the incisional hernia will be less.

The maximum time taken for the primary trocar in open technique was only 5 minutes and minimum was 3 minutes.

The average time taken for the primary trocar in open technique was only 4 min.

Hence open access technique is the safe, quick to perform and best technique than closed technique for all the patients.

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PROFORMA

Name :- I. P. No

Age :- Unit

Sex :- D.O.A

Occupation :- D.O.D

Address :-
Phone no : D.O. surgery

CHIEF COMPLAINTS:

1) pain abdomen

2) fever

3) nausea/ vomiting

4) anorexia

5) other complaints

HISTORY OF PRESENTING ILLNESS:

PAST HISTORY

1) History of similar complains

2) Treatment taken

3) History of previous surgeries

4) History suggestive of Hypertension/ Diabetes/ Tuberculosis

PERSONAL HISTORY

Diet: Vegetarian/ Mixed

Habits: Smoking/ Alcohol/ Tobacco

Bowel habits

Bladder habits

Sleep

FAMILY HISTORY

Marital status

MENSTRUAL HISTORY

Age of menarche

Dysmenorrhoea

LMP

Cycle

GENERAL PHYSICAL EXAMINATION

1. General survey

2. Body build and nourishment

3. Appearance

4. Attitude: Restless/ Quiet

5. Dehydration: Mild/ Moderate/ Severe/ Nil

6. Anaemia/ Jaundice/ Clubbing/ Cyanosis/ Lymphadenopathy/ Pedal

oedema

7. Pulse

8. Temperature

9. Respiratory rate

10. Blood pressure

LOCAL EXAMINATION

1. INSPECTION

2. PALPATION

3. PERCUSSION

4. AUSCULTATION

VAGINAL EXAMINATION

RECTAL EXAMINATION

SYSTEMIC EXAMINATION

- Cardiovascular system
- Respiratory system
- Central nervous system
- Genito-urinary system

INVESTIGATIONS

1. Blood: Hb %

2. TLC

3. DLC

4. BT

5. CT

6. ESR

7. Blood group and rh type

8. Urine: Albumin/ Sugar/ Microscopy

9. Chest x-ray / x-ray Abdomen erect view

10. HIV

11. HbsAg

12. Others

13. USG abdomen and pelvis and CT abdomen

DIAGNOSIS

MANAGEMENT

SURGICAL

Pre operative instructions

Type of Anaesthesia

Type of incision

Post-operative instructions

Post-operative period

Post-operative complication management

MASTER CHART [OPEN METHOD]														
S. No	Name	Age	Sex	Duration in Min	COMPLICATIONS								Pain	Pain at Discharge
					Port Site Gas Leakage	Vascular Injury	Bowel Injury	Omental Injury	Extra-Peritoneal Insufflations	Gas Em bolism	Loss Of Space	Entry in Wrong Plane		
1	VIJAYAKUMAR	27	M	8	Y								Severe	Moderate
2	SHANTHA	29	F	5	Y								Severe	No pain
3	RAJANGAM	32	M	6									Moderate	No pain
4	LAKSHMIPATHI	31	M	2									Moderate	No pain
5	INDRAJITH	28	M	2									Severe	Moderate
6	ANBUMURUGAN	24	M	4	Y			Y				Y	Moderate	Moderate
7	KAVITHA	27	F	2									Severe	Moderate
8	MAHALINGAM	52	M	4	Y								Moderate	No pain
9	VELPANDI	47	M	5									Severe	Moderate
10	RAJAMMAL	53	F	3									Moderate	Moderate
11	ANANDAKUMAR	29	M	5					Y				Severe	No pain
12	SRINIVASAN	35	M	4									Moderate	No pain
13	VELMURUGAN	39	M	4	Y								Very Severe	Moderate
14	SATHYAN	53	M	6	Y								Moderate	Moderate
15	CHINNATHAI	31	F	4									Severe	No pain
16	MAYANDI	57	M	6									Moderate	Moderate
17	KASIVISHWANATHAN	51	M	3								Y	Severe	Moderate
18	SADAYAPILLAI	54	M	3									Moderate	No pain
19	ANNAMALAI	32	M	6	Y								Moderate	No pain
20	PONNUTHAI	40	F	7									Severe	Moderate
21	THANGAMUTHU	54	M	3	Y								Moderate	No pain
22	ALAMELU	51	F	5									Severe	Moderate
23	VETRISELVAN	28	M	4	Y								Moderate	No pain

24	SELVAM	48	M	3	Y								Moderate	No pain
25	Giri	55	M	5	Y								Moderate	No pain
26	MANI	38	M	4									Severe	Moderate
27	PETCHI	36	F	3									Severe	No pain
28	KASIVISHWANATHAN	32	M	2	Y						Y		Moderate	No pain
29	SADAYAPILLAI	33	M	2									Severe	Moderate
30	THANGAMUTHU	25	M	7									Severe	No pain
31	PANDI	39	M	5	Y								Moderate	Moderate
32	PONNUSAMY	45	M	6	Y								Severe	No pain
33	NIRMALKUMAR	46	M	3				Y					Moderate	Moderate
34	SASIKUMAR	26	M	5									Severe	No pain
35	RAJANGAM	43	M	2	Y							Y	Moderate	Moderate
36	SANKARAMMAL	54	F	6									Severe	Moderate
37	KAVERIMANI	50	M	4									Moderate	No pain
38	MAHALINGAM	41	M	2									Moderate	Moderate
39	NAGAPPAN	27	M	3									Moderate	No pain
40	RAJA	49	M	6	Y								Severe	Moderate
41	SAMPATH	25	M	4	Y								Moderate	Moderate
42	BALAGANAPATHY	37	M	6									Severe	No pain
43	PONALAGU	27	F	5									Severe	No pain
44	GANESAN	57	M	9	Y								Moderate	No pain
45	MARISAMY	43	M	5									Moderate	Moderate
46	BALAKRISHNAN	33	M	2	Y								Severe	No pain
47	PONRAJ	59	M	6									Moderate	Moderate
48	MOKKAMAYAN	50	M	3									Moderate	No pain
49	BALAMURGAN	28	M	6	Y								Severe	No pain
50	BALRAJ	30	M	6	Y								Moderate	No pain

	MASTER CHART[CLOSED METHOD]													
S. No	Name	Age	Sex	Duration in Min	COMPLICATIONS								Pain	Pain at Discharge
					Port Site Gas Leakage	Vascular Injury	Bowel Injury	Omental Injury	Extra-Peritoneal Insufflations	Gas Embolism	Loss Of Space	Entry in Wrong Plane		
1	ESWARI	32	F	3									Severe	Moderate
2	SRINIVASAN	47	M	4	Y								Severe	No pain
3	KANNAN	43	M	5	Y							Y	Moderate	No pain
4	PONALAGU	40	F	6					Y				Moderate	No pain
5	SANTHANARAJ	46	M	4	Y								Severe	Moderate
6	SIVAKUMAR	32	M	6							Y	Y	Moderate	Moderate
7	SANKARAN	47	M	4									Severe	Moderate
8	PRIYA	42	F	6	Y								Moderate	No pain
9	SELVAMANI	35	M	6				Y					Severe	Moderate
10	ISAKKI	49	M	6									Severe	Moderate
11	EASWARAN	54	M	4	Y								Severe	No pain
12	ANGAMMAL	58	F	7									Moderate	No pain
13	SIVAKUMAR	47	M	2					Y				Severe	Moderate
14	BALAMURUGAN	45	M	6									Moderate	Moderate
15	UTHANDI	39	M	4	Y								Severe	No pain
16	TAMILARASI	42	F	6								Y	Moderate	Moderate
17	TAMILSELVAM	37	M	6	Y						Y		Severe	Moderate
18	VELLAISAMY	48	M	3	Y								Severe	No pain
19	SUBBARAJ	51	M	7					Y				Moderate	Moderate
20	SELVAMANI	28	M	7									Severe	Moderate
21	DHANARAJ	22	M	8									Very Severe	No pain
22	JEYALAKSHMI	25	F	9							Y	Y	Severe	Moderate
23	BASKARAN	31	M	7	Y								Severe	No pain

24	SARAVANAN	33	M	4									Moderate	No pain
25	SIVAKUMAR P	37	M	3	Y								Moderate	No pain
26	PANDI	36	M	5									Severe	Moderate
27	MALATHI	36	F	8	Y								Severe	No pain
28	THANGAMUTHU	23	M	7									Severe	No pain
29	DHAMAYANTHI	48	F	7								Y	Severe	Moderate
30	PALANISAMY	43	M	2				Y					Severe	No pain
31	SANTHAKUMAR	39	M	6									Moderate	Moderate
32	VELMURUGAN	53	M	3	Y						Y		Severe	No pain
33	PANDIYAN	47	M	3									Moderate	Moderate
34	KARUNANIDHI	52	M	5	Y							Y	Severe	No pain
35	MARISAMY	45	M	4									Moderate	Moderate
36	AMSU	43	F	7	Y								Severe	Moderate
37	ALAGAR	29	M	6									Severe	No pain
38	CHINNARAJA	43	M	4	Y						Y		Moderate	Moderate
39	LATCHUMANAN	43	M	2									Severe	No pain
40	MURUGAN	26	M	11									Severe	Moderate
41	GANESAN	47	M	4									Moderate	Moderate
42	BALAGANAPATHY	52	M	2	Y								Severe	No pain
43	BALAKRISHNAN	28	M	7									Severe	No pain
44	BACKIYALAKSHMI	34	F	9	Y				Y			Y	Moderate	No pain
45	GURUSAMY	49	M	5									Moderate	Moderate
46	SUNDAR	44	M	8	Y								Severe	No pain
47	PANDI	39	M	9							Y		Moderate	Moderate
48	KUMAR	32	M	8									Severe	No pain
49	PARAMASIVAM	50	M	7	Y							Y	Severe	No pain
50	SENTHIL	39	M	3	Y								Moderate	No pain

MADURAI MEDICAL COLLEGE
MADURAI, TAMILNADU, INDIA -625 020
(Affiliated to The Tamilnadu Dr.MGR Medical University, Chennai, Tamil Nadu)

ETHICS COMMITTEE CERTIFICATE

Name of the Candidate	:	Dr.Ilayaraja S
Course	:	PG in MS., General Surgery
Period of Study	:	2016-2019
College	:	MADURAI MEDICAL COLLEGE
Research Topic		Comparative Study Of Peritoneal Access By Open Vs Closed Technique For Creating Pneumoperitoneum In Laparoscopic Surgeries
Ethical Committee as on	:	21.11.2017

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary | Chairman | Dean / Convenor

Prof Dr V Nagaraajan
M.D., MNAMS, D.M., Dsc.,(Neuro), Dsc (Hon)
CHAIRMAN
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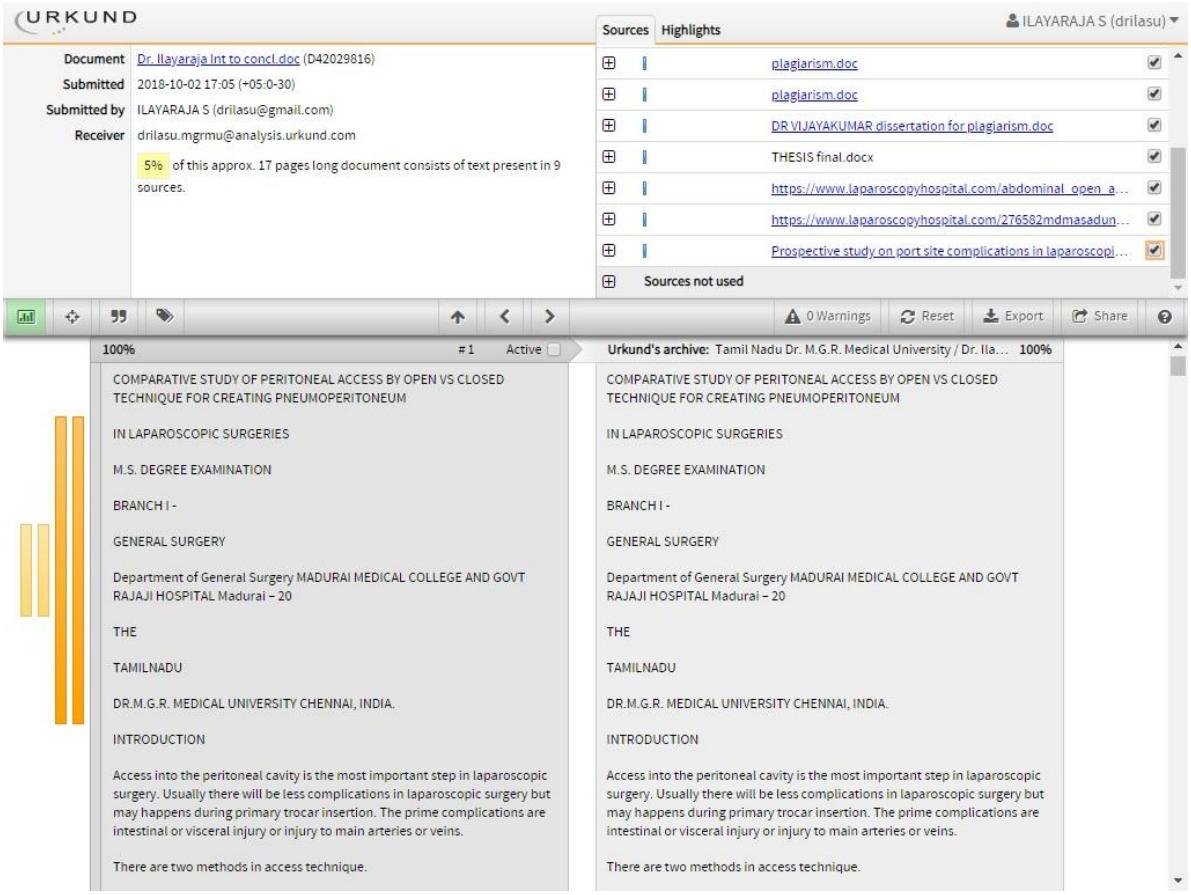
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Highlights
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COMPARATIVE STUDY OF PERITONEAL ACCESS BY OPEN VS CLOSED TECHNIQUE FOR CREATING PNEUMOPERITONEUM
IN LAPAROSCOPIC SURGERIES
M.S. DEGREE EXAMINATION
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Department of General Surgery MADURAI MEDICAL COLLEGE AND GOVT RAJAJI HOSPITAL Madurai – 20
THE
TAMILNADU
DR.M.G.R. MEDICAL UNIVERSITY CHENNAI, INDIA.
INTRODUCTION
Access into the peritoneal cavity is the most important step in laparoscopic surgery. Usually there will be less complications in laparoscopic surgery but may happens during primary trocar insertion. The prime complications are intestinal or visceral injury or injury to main arteries or veins.
There are two methods in access technique.

Urkund Analysis Result

Analysed Document:	Dr. Ilayaraja Int to concl.doc (D42029816)
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Submitted By:	drilasu@gmail.com
Significance:	5 %

Sources included in the report:

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